

PERMIT RENEWAL APPLICATION

FOR

CLASS I NON-HAZARDOUS

INDUSTRIAL INJECTION WELL

(UIC Permit No. KYI 0429)

Aleris Recycling Inc.

Morgantown Plant

Morgantown, Kentucky

February 22, 2011

Prepared by

A & M Engineering and Environmental Services, Inc.

10010 E. 16th Street

Tulsa, Oklahoma 74128

918-665-6575

*WMM
3/7/2011*



United States Environmental Protection Agency
Underground Injection Control
Permit Application
(Collected under the authority of the Safe Drinking
Water Act, Sections 1421, 1422, 40 CFR 144)

I. EPA ID Number		T/A	C

Read Attached Instructions Before Starting
For Official Use Only

Application approved mo day year	Date received mo day year	Permit Number	Well ID	FINDS Number

II. Owner Name and Address

III. Operator Name and Address

Owner Name Alerts Recycling, Inc.	Owner Name Same
Street Address 609 Gardner Camp Road, Highway 1468	Street Address
City Morgantown	City
State KY	State
ZIP CODE 42261	ZIP CODE
Phone Number (270) 526-5688	Phone Number

IV. Commercial Facility

V. Ownership

VI. Legal Contact

VII. SIC Codes

<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Private <input type="checkbox"/> Federal <input type="checkbox"/> Other	<input type="checkbox"/> Owner <input type="checkbox"/> Operator
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VIII. Well Status (Mark "x")

<input checked="" type="checkbox"/> A. Operating	Date Started mo day year 10/09/1992	<input type="checkbox"/> B. Modification/Conversion	<input type="checkbox"/> C. Proposed
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IX. Type of Permit Requested (Mark "x" and specify if required)

<input checked="" type="checkbox"/> A. Individual	<input type="checkbox"/> B. Area	Number of Existing Wells One (1)	Number of Proposed Wells	Name(s) of field(s) or project(s)
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X. Class and Type of Well (see reverse)

A. Class(es) (enter code(s))	B. Type(s) (enter code(s))	C. If class is "other" or type is code "x," explain	D. Number of wells per type (if area permit)
Class 1	1		

XI. Location of Well(s) or Approximate Center of Field or Project

XII. Indian Lands (Mark "x")

Latitude		Longitude		Township and Range		Feet From		Line		Yes		
Deg	Min	Sec	Deg	Min	Sec	14	Sec	1/4	Sec	Feet From	Line	
37	12	23	086	043	030	14	1	34		2340	S	160

XIII. Attachments

(Complete the following questions on a separate sheet(s) and number accordingly; see instructions)
For Classes I, II, III, (and other classes) complete and submit on a separate sheet(s) Attachments A-U (pp 2-6) as appropriate. Attach maps where required. List attachments by letter which are applicable and are included with your application.

XIV. Certification

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR 144.32)

A. Name and Title (Type or Print) Ty Brown, Plant Manager	B. Phone No. (Area Code and No.) (270) 526-5688
C. Signature 	D. Date Signed 5-6-11

INSTRUCTIONS - Underground Injection Control (UIC) Permit Application

Paperwork Reduction Act: The public reporting and record keeping burden for this collection of information is estimated to average 394 hours for a Class I hazardous well application, 252 hours for a Class I non-hazardous well application, 32 hours for a Class II well application, and 119 hours for a Class III well application. Burden means the total time, effort, or financial resource expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal Agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to the collection of information; search data sources; complete and review the collection of information; and, transmit or otherwise disclose the information. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including the use of automated collection techniques to Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822), 1200 Pennsylvania Ave., NW, Washington, DC 20460. Include the OMB control number in any correspondence. Do not send the completed forms to this address.

This form must be completed by all owners or operators of Class I, II, and III injection wells and others who may be directed to apply for permit by the Director.

I. EPA I.D. NUMBER - Fill in your EPA Identification Number. If you do not have a number, leave blank.

II. OWNER NAME AND ADDRESS - Name of well, well field or company and address.

III. OPERATOR NAME AND ADDRESS - Name and address of operator of well or well field.

IV. COMMERCIAL FACILITY - Mark the appropriate box to indicate the type of facility.

V. OWNERSHIP - Mark the appropriate box to indicate the type of ownership.

VI. LEGAL CONTACT - Mark the appropriate box.

VII. SIC CODES - List at least one and no more than four Standard Industrial Classification (SIC) Codes that best describe the nature of the business in order of priority.

VIII. WELL STATUS - Mark Box A if the well(s) were operating as injection wells on the effective date of the UIC Program for the State. Mark Box B if well(s) existed on the effective date of the UIC Program for the State but were not utilized for injection. Box C should be marked if the application is for an underground injection project not constructed or not completed by the effective date of the UIC Program for the State.

IX. TYPE OF PERMIT - Mark "individual" or "Area" to indicate the type of permit desired. Note that area permits are at the discretion of the Director and that wells covered by an area permit must be at one site, under the control of one person and do not inject hazardous waste. If an area permit is requested the number of wells to be included in the permit must be specified and the wells described and identified by location. If the area has a commonly used name, such as the "Jay Field," submit the name in the space provided. In the case of a project or field which crosses State lines, it may be possible to consider an area permit if EPA has jurisdiction in both States. Each such case will be considered individually, if the owner/operator elects to seek an area permit.

X. CLASS AND TYPE OF WELL - Enter in these two positions the Class and type of injection well for which a permit is requested. Use the most pertinent code selected from the list on the reverse side of the application. When selecting type X please explain in the space provided.

XI. LOCATION OF WELL - Enter the latitude and longitude of the existing or proposed well expressed in degrees, minutes, and seconds or the location by township, and range, and section, as required by 40 CFR Part 146. If an area permit is being requested, give the latitude and longitude of the approximate center of the area.

XII. INDIAN LANDS - Place an "X" in the box if any part of the facility is located on Indian lands.

XIII. ATTACHMENTS - Note that information requirements vary depending on the injection well class and status. Attachments for Class I, II, III are described on pages 4 and 5 of this document and listed by Class on page 2. Place EPA ID number in the upper right hand corner of each page of the Attachments.

XIV. CERTIFICATION - All permit applications (except Class II) must be signed by a responsible corporate officer for a corporation, by a general partner for a partnership, by the proprietor of a sole proprietorship, and by a principal executive or ranking elected official for a public agency. For Class II, the person described above should sign, or a representative duly authorized in writing.

E. NAME AND DEPTH OF USDWs (CLASS II) - For Class II wells, submit geologic name, and depth to bottom of all underground sources of drinking water which may be affected by the injection.

F. MAPS AND CROSS SECTIONS OF GEOLOGIC STRUCTURE OF AREA - Submit maps and cross sections detailing the geologic structure of the local area (including the lithology of injection and confining intervals) and generalized maps and cross sections illustrating the regional geologic setting. (Does not apply to Class II wells.)

G. GEOLOGICAL DATA ON INJECTION AND CONFINING ZONES (CLASS II) - For Class II wells, submit appropriate geological data on the injection zone and confining zones including lithologic description, geological name, thickness, depth and fracture pressure.

H. OPERATING DATA - Submit the following proposed operating data for each well (including all those to be covered by area permits): (1) average and maximum daily rate and volume of the fluids to be injected; (2) average and maximum injection pressure; (3) nature of annulus fluid; (4) for Class I wells, source and analysis of the chemical, physical, radiological and biological characteristics, including density and corrosiveness, of injection fluids; (5) for Class II wells, source and analysis of the physical and chemical characteristics of the injection fluid; (6) for Class III wells, a qualitative analysis and ranges in concentrations of all constituents of injected fluids. If the information is proprietary, maximum concentrations only may be submitted, but all records must be retained.

I. FORMATION TESTING PROGRAM - Describe the proposed formation testing program. For Class I wells the program must be designed to obtain data on fluid pressure, temperature, fracture pressure, other physical, chemical, and radiological characteristics of the injection matrix and physical and chemical characteristics of the formation fluids.

For Class II wells the testing program must be designed to obtain data on fluid pressure, estimated fracture pressure, physical and chemical characteristics of the injection zone. (Does not apply to existing Class II wells or projects.)

For Class III wells the testing must be designed to obtain data on fluid pressure, fracture pressure, and physical and chemical characteristics of the formation fluids if the formation is naturally water bearing. Only fracture pressure is required if the program formation is not water bearing. (Does not apply to existing Class III wells or projects.)

J. STIMULATION PROGRAM - Outline any proposed stimulation program.

K. INJECTION PROCEDURES - Describe the proposed injection procedures including pump, surge, tank, etc.

L. CONSTRUCTION PROCEDURES - Discuss the construction procedures (according to §146.12 for Class I, §146.22 for Class II, and §146.32 for Class III) to be utilized. This should include details of the casing and cementing program, logging procedures, deviation checks, and the drilling, testing and coring program, and proposed annulus fluid. (Request and submission of justifying data must be made to use an alternative to packer for Class I.)

M. CONSTRUCTION DETAILS - Submit schematic or other appropriate drawings of the surface and subsurface construction details of the well.

N. CHANGES IN INJECTED FLUID - Discuss expected changes in pressure, native fluid displacement, and direction of movement of injection fluid. (Class III wells only.)

O. PLANS FOR WELL FAILURES - Outline contingency plans (proposed plans, if any, for Class II) to cope with all shut-ins or wells failures, so as to prevent migration of fluids into any USDW.

P. MONITORING PROGRAM - Discuss the planned monitoring program. This should be thorough, including maps showing the number and location of monitoring wells as appropriate and discussion of monitoring devices, sampling frequency, and parameters measured. If a manifold monitoring program is utilized, pursuant to §146.23(b)(5), describe the program and compare it to individual well monitoring.

Q. PLUGGING AND ABANDONMENT PLAN - Submit a plan for plugging and abandonment of the well including: (1) describe the type, number, and placement (including the elevation of the top and bottom) of plugs to be used; (2) describe the type, grade, and quantity of cement to be used; and (3) describe the method to be used to place plugs, including the method used to place the well in a state of static equilibrium prior to placement of the plugs. Also for a Class III well that underlies or is in an exempted aquifer, demonstrate adequate protection of USDWs. Submit this information on EPA Form 7520-14, Plugging and Abandonment Plan.

§ 146.11

40 CFR Ch. I (7–1-02 Edition)

which will not allow the movement of fluids either into or between underground sources of drinking water. The Director may allow Class III wells to use other plugging materials if the Director is satisfied that such materials will prevent movement of fluids into or between underground sources of drinking water.

(2) Placement of the cement plugs shall be accomplished by one of the following:

- (i) The Balance method;
- (ii) The Dump Baller method;
- (iii) The Two-Plug method; or
- (iv) An alternative method approved by the Director, which will reliably provide a comparable level of protection to underground sources of drinking water.

(3) The well to be abandoned shall be in a state of static equilibrium with the mud weight equalized top to bottom, either by circulating the mud in the well at least once or by a comparable method prescribed by the Director, prior to the placement of the cement plug(s).

(4) The plugging and abandonment plan required in 40 CFR 144.51(o) and 144.52(a)(6) shall, in the case of a Class III project which underlies or is in an aquifer which has been exempted under §146.04, also demonstrate adequate protection of USDWs. The Director shall prescribe aquifer cleanup and monitoring where he deems it necessary and feasible to insure adequate protection of USDWs.

(b) Requirements for Class IV wells. Prior to abandoning a Class IV well, the owner or operator shall close the well in accordance with 40 CFR 144.23(b).

(c) Requirements for Class V wells. (1) Prior to abandoning a Class V well, the owner or operator shall close the well in a manner that prevents the movement of fluid containing any contaminant into an underground source of drinking water. If the presence of that contaminant may cause a violation of any primary drinking water regulation under 40 CFR part 141 or may otherwise adversely affect the health of persons. Closure requirements for motor vehicle waste disposal wells and large-capacity cesspools are reiterated at §144.89.

(2) The owner or operator shall dispose of or otherwise manage any soil, gravel, sludge, liquids, or other materials removed from or adjacent to the well in accordance with all applicable Federal, State, and local regulations and requirements.

[64 FR 68573, Dec. 7, 1999]

**Subpart B—Criteria and Standards
Applicable to Class I Wells**

§ 146.11 Criteria and standards applicable to Class I nonhazardous wells.

This subpart establishes criteria and standards for underground injection control programs to regulate Class I nonhazardous wells.

[63 FR 28148, July 26, 1998]

§ 146.12 Construction requirements.

(a) All Class I wells shall be sited in such a fashion that they inject into a formation which is beneath the lowermost formation containing, within one quarter mile of the well bore, an underground source of drinking water.

(b) All Class I wells shall be cased and cemented to prevent the movement of fluids into or between underground sources of drinking water. The casing and cement used in the construction of each newly drilled well shall be designed for the life expectancy of the well. In determining and specifying casing and cementing requirements, the following factors shall be considered:

- (1) Depth to the injection zone;
- (2) Injection pressure, external pressure, internal pressure, and axial loading;

(3) Hole size;

(4) Size and grade of all casing strings (wall thickness, diameter, nominal weight, length, joint specification, and construction material);

(5) Corrosiveness of injected fluid, formation fluids, and temperatures;

(6) Lithology of injection and confining intervals; and

(7) Type or grade of cement.

(c) All Class I injection wells, except those municipal wells injecting non-corrosive wastes, shall inject fluids through tubing with a packer set immediately above the injection zone, or tubing with an approved fluid seal as

Environmental Protection Agency

§ 146.13

an alternative. The tubing, packer, and fluid seal shall be designed for the expected service.

(1) The use of other alternatives to a packer may be allowed with the written approval of the Director. To obtain approval, the operator shall submit a written request to the Director, which shall set forth the proposed alternative and all technical data supporting its use. The Director shall approve the request if the alternative method will reliably provide a comparable level of protection to underground sources of drinking water. The Director may approve an alternative method solely for an individual well or for general use.

(2) In determining and specifying requirements for tubing, packer, or alternatives the following factors shall be considered:

- (i) Depth of setting;
- (ii) Characteristics of injection fluid (chemical content, corrosiveness, and density);
- (iii) Injection pressure;
- (iv) Annular pressure;
- (v) Rate, temperature and volume of injected fluid; and
- (vi) Size of casing.

(d) Appropriate logs and other tests shall be conducted during the drilling and construction of new Class I wells. A descriptive report interpreting the results of such logs and tests shall be prepared by a knowledgeable log analyst and submitted to the Director. At a minimum, such logs and tests shall include:

(1) Deviation checks on all holes constructed by first drilling a pilot hole, and then enlarging the pilot hole by reaming or another method. Such checks shall be at sufficiently frequent intervals to assure that vertical avenues for fluid migration in the form of diverging holes are not created during drilling.

(2) Such other logs and tests as may be needed after taking into account the availability of similar data in the area of the drilling site, the construction plan, and the need for additional information, that may arise from time to time as the construction of the well progresses. In determining which logs and tests shall be required, the following logs shall be considered for use in the following situations:

(i) For surface casing intended to protect underground sources of drinking water:

- (A) Resistivity, spontaneous potential, and caliper logs before the casing is installed; and
- (B) A cement bond, temperature, or density log after the casing is set and cemented.

(ii) For intermediate and long strings of casing intended to facilitate injection:

- (A) Resistivity, spontaneous potential, porosity, and gamma ray logs before the casing is installed;
 - (B) Fracture finder logs; and
 - (C) A cement bond, temperature, or density log after the casing is set and cemented.
- (e) At a minimum, the following information concerning the injection formation shall be determined or calculated for new Class I wells:
- (1) Fluid pressure;
 - (2) Temperature;
 - (3) Fracture pressure;
 - (4) Other physical and chemical characteristics of the injection matrix; and
 - (5) Physical and chemical characteristics of the formation fluids.

[45 FR 42500, June 24, 1980, as amended at 48 FR 43162, Aug. 27, 1981]

§ 146.13 Operating, monitoring and reporting requirements.

(a) *Operating requirements.* Operating requirements shall at a minimum, specify that:

(1) Except during stimulation injection pressure at the wellhead shall not exceed a maximum which shall be calculated so as to assure that the pressure in the injection zone during injection does not initiate new fractures or propagate existing fractures in the injection zone. In no case shall injection pressure initiate fractures in the confining zone or cause the movement of injection or formation fluids into an underground source of drinking water.

(2) Injection between the outermost casing protecting underground sources of drinking water and the well bore is prohibited.

(3) Unless an alternative to a packer has been approved under §146.12(c), the annulus between the tubing and the long string of casings shall be filled with a fluid approved by the Director

§ 146.14

40 CFR Ch. I (7–1–02 Edition)

and a pressure, also approved by the Director, shall be maintained on the annulus.

(b) *Monitoring requirements.* Monitoring requirements shall, at a minimum, include:

(1) The analysis of the injected fluids with sufficient frequency to yield representative data of their characteristics;

(2) Installation and use of continuous recording devices to monitor injection pressure, flow rate and volume, and the pressure on the annulus between the tubing and the long string of casing;

(3) A demonstration of mechanical integrity pursuant to § 146.8 at least once every five years during the life of the well; and

(4) The type, number and location of wells within the area of review to be used to monitor any migration of fluids into and pressure in the underground sources of drinking water, the parameters to be measured and the frequency of monitoring.

(c) *Reporting requirements.* Reporting requirements shall, at a minimum, include:

(1) Quarterly reports to the Director on:

(i) The physical, chemical and other relevant characteristics of injection fluids;

(ii) Monthly average, maximum and minimum values for injection pressure, flow rate and volume, and annular pressure; and

(iii) The results of monitoring prescribed under paragraph (b)(4) of this section.

(2) Reporting the results, with the first quarterly report after the completion of:

(i) Periodic tests of mechanical integrity;

(ii) Any other test of the injection well conducted by the permittee if required by the Director; and

(iii) Any well work over.

(d) *Ambient monitoring.* (1) Based on a site-specific assessment of the potential for fluid movement from the well or injection zone and on the potential value of monitoring wells to detect such movement, the Director shall require the owner or operator to develop a monitoring program. At a minimum, the Director shall require monitoring

of the pressure buildup in the injection zone annually, including at a minimum, a shut down of the well for a time sufficient to conduct a valid observation of the pressure fall-off curve.

(2) When prescribing a monitoring system the Director may also require:

(1) Continuous monitoring for pressure changes in the first aquifer overlying the confining zone. When such a well is installed, the owner or operator shall, on a quarterly basis, sample the aquifer and analyze for constituents specified by the Director;

(ii) The use of indirect, geophysical techniques to determine the position of the waste front, the water quality in a formation designated by the Director, or to provide other site specific data;

(iii) Periodic monitoring of the ground water quality in the first aquifer overlying the injection zone;

(iv) Periodic monitoring of the ground water quality in the lowermost USDW; and

(v) Any additional monitoring necessary to determine whether fluids are moving into or between USDWs.

(45 FR 42500, June 24, 1980, as amended at 46 FR 43162, Aug. 27, 1981; 47 FR 32129, July 26, 1982; 53 FR 28148, July 26, 1988)

§ 146.14 Information to be considered by the Director.

This section sets forth the information which must be considered by the Director in authorizing Class I wells. For an existing or converted new Class I well the Director may rely on the existing permit file for those items of information listed below which are current and accurate in the file. For a newly drilled Class I well, the Director shall require the submission of all the information listed below. For both existing and new Class I wells certain maps, cross-sections, tabulations of wells within the area of review and other data may be included in the application by reference provided they are current, readily available to the Director (for example, in the permitting agency's files) and sufficiently identified to be retrieved. In cases where EPA issues the permit all the information in this section must be submitted to the Administrator.

(a) Prior to the issuance of a permit for an existing Class I well to operate

Environmental Protection Agency

§ 146.14

or the construction or conversion of a new Class I well the Director shall consider the following:

(1) Information required in 40 CFR 144.31 and 144.31(g);

(2) A map showing the injection well(s) for which a permit is sought and the applicable area of review. Within the area of review, the map must show the number, or name, and location of all producing wells, dry holes, surface bodies of water, springs, mines (surface and subsurface), quarries, water wells and other pertinent surface features including residences and roads. The map should also show faults, if known or suspected. Only information of public record is required to be included on this map;

(3) A tabulation of data on all wells within the area of review which penetrate into the proposed injection zone. Such data shall include a description of each well's type, construction, date drilled, location, depth, record of plugging and/or completion, and any additional information the Director may require;

(4) Maps and cross sections indicating the general vertical and lateral limits of all underground sources of drinking water within the area of review, their position relative to the injection formation and the direction of water movement, where known, in each underground source of drinking water which may be affected by the proposed injection;

(5) Maps and cross sections detailing the geologic structure of the local area;

(6) Generalized maps and cross sections illustrating the regional geologic setting;

(7) Proposed operating data:

(i) Average and maximum daily rate and volume of the fluid to be injected;

(ii) Average and maximum injection pressure; and

(iii) Source and an analysis of the chemical, physical, radiological and biological characteristics of injection fluids;

(8) Proposed formation testing program to obtain an analysis of the chemical, physical and radiological characteristics of and other information on the receiving formation;

(9) Proposed stimulation program;

(10) Proposed injection procedure;

(11) Schematic or other appropriate drawings of the surface and subsurface construction details of the well.

(12) Contingency plans to cope with all shut-ins or well failures so as to prevent migration of fluids into any underground source of drinking water;

(13) Plans (including maps) for meeting the monitoring requirements in §146.13(b);

(14) For wells within the area of review which penetrate the injection zone but are not properly completed or plugged, the corrective action proposed to be taken under 40 CFR 144.55;

(15) Construction procedures including a cementing and casing program, logging procedures, deviation checks, and a drilling, testing, and coring program; and

(16) A certificate that the applicant has assured, through a performance bond or other appropriate means, the resources necessary to close, plug or abandon the well as required by 40 CFR 122.42(g).

(b) Prior to granting approval for the operation of a Class I well the Director shall consider the following information:

(1) All available logging and testing program data on the well;

(2) A demonstration of mechanical integrity pursuant to §148.8;

(3) The anticipated maximum pressure and flow rate at which the permittee will operate;

(4) The results of the formation testing program;

(5) The actual injection procedure;

(6) The compatibility of injected waste with fluids in the injection zone and minerals in both the injection zone and the confining zone; and

(7) The status of corrective action on defective wells in the area of review.

(c) Prior to granting approval for the plugging and abandonment of a Class I well the Director shall consider the following information:

(1) The type and number of plugs to be used;

(2) The placement of each plug including the elevation of the top and bottom;

(3) The type and grade and quantity of cement to be used;

(4) The method for placement of the plugs; and

§ 146.21

(5) The procedure to be used to meet the requirement of § 146.10(c).

(Clean Water Act, Safe Drinking Water Act, Clean Air Act, Resource Conservation and Recovery Act: 42 U.S.C. 6905, 6912, 6925, 6927, 6974)

[45 FR 42500, June 24, 1980, as amended at 46 FR 43162, Aug. 27, 1981; 46 FR 14293, Apr. 1, 1983]

Subpart C—Criteria and Standards
Applicable to Class II Wells

§ 146.21 Applicability.

This subpart establishes criteria and standards for underground injection control programs to regulate Class II wells.

§ 146.22 Construction requirements.

(a) All new Class II wells shall be sited in such a fashion that they inject into a formation which is separated from any USDW by a confining zone that is free of known open faults or fractures within the area of review.

(b)(1) All Class II injection wells shall be cased and cemented to prevent movement of fluids into or between underground sources of drinking water. The casing and cement used in the construction of each newly drilled well shall be designed for the life expectancy of the well. In determining and specifying casing and cementing requirements, the following factors shall be considered:

- (i) Depth to the injection zone;
 - (ii) Depth to the bottom of all USDWs; and
 - (iii) Estimated maximum and average injection pressures;
- (2) In addition the Director may consider information on:
- (i) Nature of formation fluids;
 - (ii) Lithology of injection and confining zones;
 - (iii) External pressure, internal pressure, and axial loading;
 - (iv) Hole size;
 - (v) Size and grade of all casing strings; and
 - (vi) Class of cement.
- (c) The requirements in paragraph (b) of this section need not apply to existing or newly converted Class II wells located in existing fields if:
- (1) Regulatory controls for casing and cementing existed for those wells

40 CFR Ch. I (7–1–02 Edition)

at the time of drilling and those wells are in compliance with those controls;

and

(2) Well injection will not result in the movement of fluids into an underground source of drinking water so as to create a significant risk to the health of persons.

(d) The requirements in paragraph (b) of this section need not apply to newly drilled wells in existing fields if:

(1) They meet the requirements of the State for casing and cementing applicable to that field at the time of submission of the State program to the Administrator; and

(2) Well injection will not result in the movement of fluids into an underground source of drinking water so as to create a significant risk to the health of persons.

(e) Where a State did not have regulatory controls for casing and cementing prior to the time of the submission of the State program to the Administrator, the Director need not apply the casing and cementing requirements in paragraph (b) of this section if he submits as a part of his application for primacy, an appropriate plan for casing and cementing of existing, newly converted, and newly drilled wells in existing fields, and the Administrator approves the plan.

(f) Appropriate logs and other tests shall be conducted during the drilling and construction of new Class II wells. A descriptive report interpreting the results of that portion of those logs and tests which specifically relate to (1) an USDW and the confining zone adjacent to it, and (2) the injection and adjacent formations shall be prepared by a knowledgeable log analyst and submitted to the director. At a minimum, these logs and tests shall include:

(1) Deviation checks on all holes constructed by first drilling a pilot hole and then enlarging the pilot hole, by reaming or another method. Such checks shall be at sufficiently frequent intervals to assure that vertical averages for fluid movement in the form of diverging holes are not created during drilling.

(2) Such other logs and tests as may be needed after taking into account the availability of similar data in the area

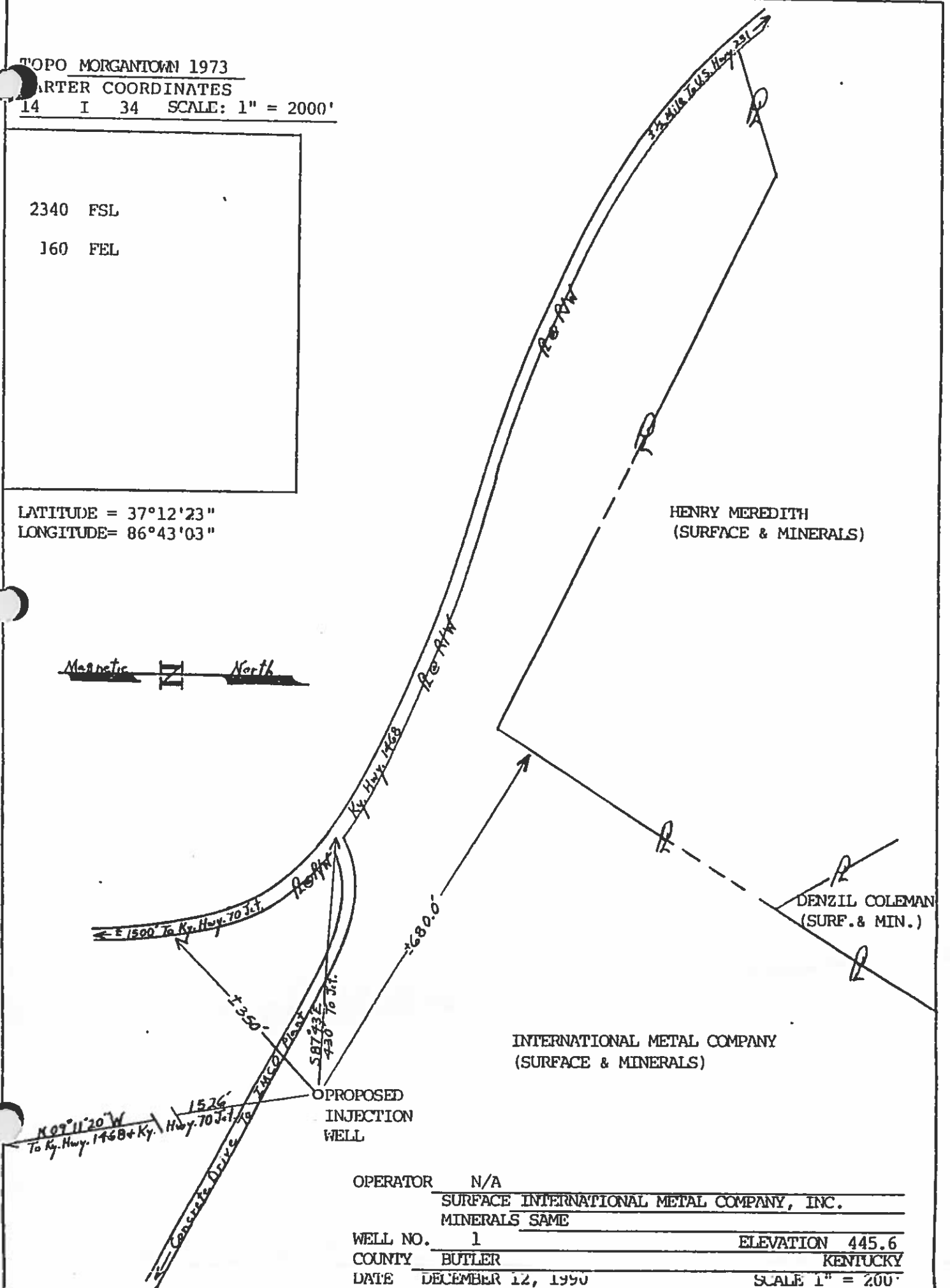
TOPO MORGANTOWN 1973
ARTER COORDINATES
14 I 34 SCALE: 1" = 2000'

2340 FSL

160 FEL

LATITUDE = 37°12'23"
LONGITUDE = 86°43'03"

Magnetic North



OPERATOR N/A
SURFACE INTERNATIONAL METAL COMPANY, INC.
MINERALS SAME
WELL NO. 1 ELEVATION 445.6
COUNTY BUTLER KENTUCKY
DATE DECEMBER 12, 1990 SCALE 1" = 200'

SURVEYOR: MARK P. JOHNSON

11074 ROCHESTER ROAD

ROCHESTER, KY 42273 (502)934-5301

I HEREBY CERTIFY THAT THE ABOVE PLAT IS ACCURATE AND
SATISFIES THE REQUIREMENTS OF 805 KAR 1:030 TO THE BEST
OF MY KNOWLEDGE AND BELIEF.

Mark P. Johnson Ky Reg. 2557 12-12-90
KY REG. LAND SURVEYOR NO. 2557

KY REG. ENGINEER NO.

SUMMARY

Aleris Recycling, Inc. was granted a permit on October 9, 1990 to construct a Class I non-hazardous industrial liquid disposal well at its plant near Morgantown, Butler County, Kentucky.

The Class I injection well was constructed during the period of August 1991-October 1992.

During the construction, due to technical difficulties, Aleris applied for two permit modifications which were granted. The construction of the well was completed at the end of September 1992 and Mechanical Integrity Test on the Aleris injection well was performed on October 9, 1992 in the presence of U.S. EPA Region IV representative. The construction and operational chronology of the Aleris injection well is presented in Exhibit 1. ✓

The Aleris injection well was drilled to 6,450 feet depth and completed as an openhole in the Knox Dolomite from 4,703 to 6,450 feet. The lowermost USDW (Underground Source Drinking Water) is encountered at a depth of 210-260 feet in Pennsylvanian sandstone. The surface casing is set and cemented at a depth of 471 feet to protect USDW sources. The long string casing is set and cemented at a depth of 4,703 feet. The injection is through tubing and injection packer. ✓

The enclosed document is prepared in accordance with permit conditions and presents all information and construction procedures for the injection well. A copy of the permit with the modifications is enclosed after the list of attachments, appendices, and figures.

Electric Logs of the injection well were previously submitted to U.S. EPA Region IV and the logs are not included with this submission. ✓

The injection well has been in operation since 1992 with no major incidents or breakdowns. During this operation history (from 1992 to 2010) over 184 million gallons (over 46 million barrels) of leachate have been injected into the well.

EXHIBIT 1

EXHIBIT 1

ALERIS RECYCLING, INC.
MORGANTOWN, KENTUCKY
INJECTION WELL

Construction Chronology

August 9-10, 1991	Move Drilling Rig and set up.
August 11-12, 1991	Drilled 17 1/2" hole to 42 feet and set up 15 ^{OK} 3/8" conductor pipe with 100 sacks of Class "A" cement.
August 12-13, 1991	Drilled 14 1/4" hole to 471. Run SP-Induction Electric Log. Set 475 feet 9 5/8" K-55 casing (36 lb/ft) with 300 sacks of Class "A" cement including 4% calcium chloride.
August 13-16, 1991	Drilled 8 3/4" hole to 2,526 feet depth.
August 17-21, 1991	Drilled 7 7/8" hole to 4,000 feet depth.
August 22, 1991	Run Cement Bond Log, Dual Induction, Gamma Ray, Compensated Density and Neutron, and Digital Sonic Logs. Set 7" K-55 casing (23 lb/ft) at 2,542 feet with 450 sacks of Class "A" cement. ✓
August 23-25, 1991	Move drilling rig out.
August 26, 1991	Move workover rig on location.
August 27-29, 1991	Drill cement and packer shoe out.
August 30-31, 1991	Cleaned the well with 2% KCl water. Run Cement Bond and Evaluation Logs and Formation Tester.
September 3-4, 1991	Test the well and acidize with 3,000 gallons of 15% HCl. Test again, low injectivity potential.
September 5 – October 15, 1991	Evaluated different options for completing the well and decision was made to drill deeper into the Knox Dolomite. New permits were obtained from U.S. EPA and Kentucky Oil and Gas Division.
October 16-18, 1991	Move drilling rig on location and rig up.

October 19-	
November 4, 1991	Drilled 6 1/8" hole to 5,872 feet depth
November 4-5, 1991	Run SP-Dual Induction, Gamma Ray and Density- Neutron Logs Run DST #1.
November 6-7, 1991	Run DST #2 and #3 and re-run DST #1
November 8-14, 1991	Drill 6 1/8" hole from 5,872 to 6,450 feet. Run SP-Dual Induction, Gamma Ray and Density-Neutron Logs.
November 15, 1991	Run DST #4.
November 16-17, 1991	Moved out the drilling rig.
November 16-21, 1991	Got approval for completion procedures from U.S. EPA and Kentucky Oil and Gas Division.
November 22-23, 1991	Move workover rig on location and rig up.
November 24-25, 1991	Clean well out.
November 26, 1991	Run 4 1/2" K-55 casing liner (10.5 lb/ft) from 2,300 to 4,703 feet. ✓ Used Baker Hyflo "III" liner hanger. Cemented the casing with 650 sacks of Class "A" cement.
November 27-	
December 2, 1991	Wait on cement to set and harden.
December 3, 1991	Start drilling cement and packer shoe with 3 7/8" bit.
December 4, 1991	Mechanical problems.
December 5-6, 1991	Drilled down to 4,702 feet. Having problem drilling the packer shoe. Having trouble with hydraulic system.
December 7, 1991	Tripped out and the cones on bit were gone.
December 9, 1991	Tried to fish the cones out. No success. Put flat bottom mil and trip in the hole.
December 10-11, 1991	Milled at the bottom (4,702') and trip out, the mill was worn out.
December 12, 1991	Run magnet again and recovered two cones and three shanks and

December 13, 1991	metal cuttings. Run impression cone and it came out clean. Trip in with a new bit.
December 14-18, 1991	Drilled the packer shoe and some very hard cement and discovered the cement leaked below the packer shoe.
December 19-27, 1991	Drilled cement to 5,115 feet.
December 28-29, 1991	Repair the swivel and gear box of the rig.
December 30-31, 1991	Cleaned the well and the mud out. Swabbed the well.
January 2, 1992	Run injection test. The result was 10-14 gallons per minute with 1,000 psi wellhead pressure.
January 3, 1992	Swab the well and pull out tubing.
January 4, 1992	Run Temperature Log and hit bridge at 5,980 feet. Trip in with bit, hit first bridge at 5,307.45' and second one at 5,987.35'. Drilled the bridges and cleaned the well, circulate for 7 hours for extra cleaning at total depth.
January 5-6, 1992	Swabbed the well for 8 hours. Pulled out tubing.
January 7, 1992	Run Differential Temperature Log from 6,457 to 2,300 feet. Run Cement Bond Log for 4 1/2" casing from 4,705 to 2,300 feet and Gamma Ray Log from 6,457 to 4,700 feet. Start perforating the porous zones with 100 gram shots. Perforated zones: 6432-38', 6420', 6402-4, 6358-74, 6315-30, 6230-52, 6182-88, 6128-38, 6074-84, 6026-34, 5988-94, 5910-16, 5842-66, 5806-10.
January 8-10, 1992	The hole bridged at 5305 feet again, the tool could not go through. Thus could not perforate the zones in between 5300-5800 feet depth. Then perforated these zones: 5148-72, 4996-5024, 4894-4904, 4834-60.
	Trip in with bit to clean the hole.
	Cleaned the hole and tripped out.
	Run Caliper Log in the open hole. Perforated the following zones: 5732-38, 5712-24, 5680-90, 5658-70, 5612-32, 5570-88, 5534-52, 5464-72, 5398-5406, 5366-70.

January 11, 1992	Trip in with the bit. Clean the hole to total depth and circulate four hours for extra cleaning. Pull out to 5150 feet depth and circulate hole for two more hours.
January 15, 1992	Trip in with packer and set it. Swab the well. Connect acid line ant tried to acidize, but some pipes were leaking. Pulled out and tested pipes for leaks.
January 16, 1992	Trip in with packer and set it. Well treated with 15,000 gallons of HCl acid (28%) in five stages.
January 17, 1992	Trip in with bit and clean hole out. Trip out.
January 20, 1992	Trip in with packer and set it. Run injection test and Tracer Log.
February 4-5, 1992	Trip in with bit and clean the hole at total depth and pull out.
February 18-October 1, 1992	Run tubing in with retrievable packer, set packer, pump annulus fluid with corrosion inhibitor and test the annulus with 1000 psi pressure, packer hold.
October 9, 1992	Installation of surface facilities and pump system.
September 4, 2001	Conduct Mechanical Integrity Test in the presence of a U.S. EPA Representative. The test was successful.
May 19-29, 2003	Permit Renewal. ✓ #1
February 2005	Well clean out all the way to the total depth, acidize, and replace 2 7/8" tubing with new internally coated tubing. Conduct MIT and put well back in operation.
February 2006	Acidize the injection well.
April 9, 2007	Acidize the injection well.
November 9, 2007	Acidize the injection well.
January 30-February 4, 2008	Well work over due to leak in tubing, pull all tubing out, and pressure test, replace one joint of 3 1/2" tubing. Conduct MIT and put well back in operation.
August 6, 2010	Acidize the injection well.

LIST OF ATTACHMENTS, APPENDICES, AND EXHIBITS

- A – Area of Review
- B – Maps of Wells/Area and Area of Review
- C – Corrective Action Plan and Well Data
- D – Maps and Cross Sections of USDW's
- E – Not Applicable
- F – Maps of Cross-Sections of Geologic Structure of Area
- G – Not Applicable
- H – Operating Data
- I – Formation Testing Program
- J – Stimulation Program
- K – Injection Procedures
- L – Construction Procedures
- M – Construction Details
- N – Not Applicable
- O – Plans for Well Failures
- P – Monitoring Program
- Q – Plugging and Abandonment Plan
- R – Necessary Resources (Financial)
- S – Not Applicable
- T- Existing EPA and State Permits
- U – Description of Business

Appendix A – Copies of Well Reports

Appendix B – Chemical Analysis Report of Solid Waste and Leachate

Appendix C – Copy of Property Deed

Appendix D – Electric Logs (Provided previously, not included in this submittal)

Appendix E – Drill Stem Tests (DST) results, formation fluid analytical reports

Appendix F – Acid Job and Injection Test Data

Appendix G – Drilling Records

Exhibit I – Construction Chronology

Exhibit H - 1 – Annulus Fluid Corrosion Inhibitor Data

Exhibit L – 1 – Surface (9 5/8”) and Long String (7”) Casing Purchase Tickets

Exhibit L – 2 – Liner Casing (4 1/2”) Tally and Purchase Tickets

Exhibit L – 3 – Liner Hanger and Hanger Job Data

Exhibit L – 4 – Tubing (3 1/2” and 2 7/8”) Tally and Purchase Tickets

Exhibit L – 5 – Injection Packer Data

Exhibit L – 6 – Casing Cementing Job Data and U.S. EPA Inspector’s Reports (Conductor Pipe,
Surface Casing, Long String and Liner)

Exhibit L – 7 – Annulus and Packer Pressure Test Data

LIST OF FIGURES

Fig. B-1	Map of area of review and surroundings
Fig. B-2	Detailed topographic map of Aleris Morgantown plant
Fig. D-1	Fresh saline water interface contour map of Butler County, Kentucky
Fig. D-2	Map of flood prone areas in the vicinity of Aleris site
Fig. F-1	Generalized structure map of Kentucky
Fig. F-2	Stratigraphic column
Fig. F-3	Structure contour map on base of Beech Creek Formation
Fig. F-4	Structure and isopach map of New Albany Shale
Fig. F-5	N-S cross-section of Butler County, Kentucky
Fig. F-6	N-S cross-section of Aleris well
Fig. F-7	W-E cross-section of Aleris well
Fig. H-1	Annulus Monitoring System
Fig. I-1	Pressure Injection Rate 1-17-92 Test
Fig. K-1	Schematic surface design drawing of the Aleris injection well
Fig. L-1	Scaled subsurface well construction
Fig. M-1	Wellhead construction
Fig. M-2	Suction System
Fig. M-3	Filter System
Fig. M-4	Injection and Monitoring System
Fig. U-1	Flow chart of plant operations, Aleris Recycling Inc., Morgantown, Kentucky



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

SEP 04 2001

REF: 4MM-GMDW

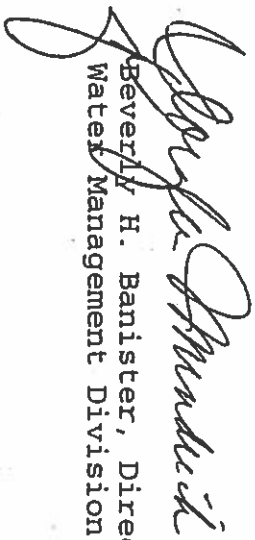
Mr. C. Lee Newton
IMCO Recycling, Inc.
609 Gardner Camp Road, Hwy 1468
Morgantown, KY 42261

SUBJ: Final UIC Permit No. KYI0429
Effective: SEP 04 2001
Permit Writer: William Mann

Dear Mr. Newton:

Enclosed is the Underground Injection Control (UIC) permit referenced above. This action constitutes the U. S. Environmental Protection Agency's final permit decision in accordance with 40 C.F.R. §124.15(a). Under 40 C.F.R. §124.19, any person who filed comments on the draft permit or participated in the public hearing may contest this decision by petitioning the Administrator to review any condition of the permit decision. In this case, since no public hearing was held and no comments were filed during the public notice period, no appeal may be taken regarding this decision. Pursuant to 40 C.F.R. §124.15(b), this permit will be effective as specified in the permit. Information on legal matters may be obtained by contacting Zylpha Pryor, Associate Regional Counsel, at (404) 562-9488.

Sincerely,


Beverly H. Banister, Director
Water Management Division

Enclosure

Rec'd 9/7/01
-DM

U. S. ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT
AUTHORIZATION TO OPERATE A CLASS I INJECTION WELL
EPA UIC PERMIT NUMBER KY10429

Pursuant to the Underground Injection Control regulations of the U.S. Environmental Protection Agency codified at Title 40 of the Code of Federal Regulations, Parts 124, 144, 146 and 147,

IMCO Recycling, Inc.
609 Gardner Camp Road, Hwy 1468
Morgantown, Kentucky 42268

is hereby authorized to operate and plug and abandon the following Class I disposal injection well:

IMCO Injection Well #1
Butler County, Kentucky
Carter Coordinate 14-I-34
2340' FSL x 160' FEL

This authorization is in accordance with the limitations, monitoring requirements and other conditions set forth herein. This permit consists of this cover sheet; Part I, 7 pages; and Part II, 14 pages.

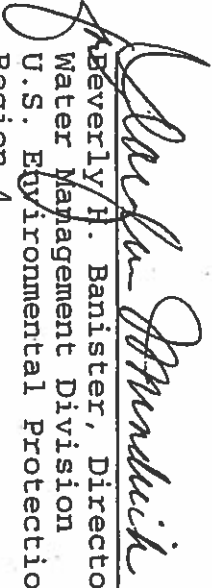
All references to Title 40 of the Code of Federal Regulations are to regulations that are in effect on the date that this permit becomes effective.

This permit shall become effective on SEP 04 2001.

This permit and the authorization to inject shall remain in full force and effect for ten (10) years. This permit may be modified, revoked and reissued, terminated, or a minor modification made as provided at 40 C.F.R. §§144.39, 144.40 and 144.41. This permit shall be reviewed at least once every five years from the effective date.

SEP 04 2001

Date


Beverly H. Banister, Director
Water Management Division
U.S. Environmental Protection Agency
Region 4

Expire
Sept 4, 2011
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PART I

WELL SPECIFIC CONDITIONS

SECTION A. CONSTRUCTION REQUIREMENTS

1. Casing and Cementing

The permittee shall maintain all casing and cement so as to prevent the movement of fluids into or between underground sources of drinking water. The casing and cement used in the construction of the well shall be designed for the life expectancy of the well.

2. Tubing and Packer

Injection may only take place through tubing with a packer set within the casing no higher than 75 feet above the base of the deepest casing. The tubing and packer shall be maintained in a manner which is compatible with the injection operation specified in Part I, Section B, and which prevents the movement of fluids into or between underground sources of drinking water.

3. Logs, Tests and Reports

The following tests and reports shall be prepared and submitted to EPA to demonstrate mechanical integrity:

- (a) A copy of all logs run in the well.
- (b) Cement tickets and invoice from the contracted cementing service company indicating cement volume, type, additives, and a job description summary.
- (c) A demonstration of the mechanical integrity of the well is required before injection can be authorized. The demonstration will consist of a pressure test on the tubing/casing annulus to at least 300 psig with less than 3% pressure loss in 30 minutes or an approved alternative MIT. The permittee shall contact EPA to arrange a date to conduct this test. A representative of EPA will be present to witness this test. If the well fails the test, the permittee shall cease injection operations until the problem is corrected and mechanical integrity can be demonstrated.
- (d) The permittee shall prepare a report, including procedures and results, of the logging and testing

programs. Each log shall include a written interpretation prepared by a knowledgeable log analyst. The report must be submitted in accordance with Part I, Section A, item 4, and shall be signed in accordance with Part II, Section E, item 11, of this permit.

4. Commencing Injection

The well authorized by this permit may not commence injection until:

- (a) Construction is complete, and the permittee has submitted to the Director, by certified mail with return receipt requested, a notice of completion using EPA Form 7520-10, and either:
 - (i) The Director has inspected or otherwise reviewed the new injection well and finds it is in compliance with the conditions of the permit; or
 - (ii) The permittee has not received, within thirteen (13) days of the date of the Director's receipt of the notice required above, notice from the Director of his or her intent to inspect or otherwise review the new injection well, in which case prior inspection or review is waived and the permittee may commence injection.

- (b) The permittee has demonstrated to EPA that the injection well has mechanical integrity, and has submitted the reports as specified in Part I, Section A, item 3.

SECTION B. OPERATING REQUIREMENTS

1. Injection Operation

Beginning on the date that Part I, Section A, item 4, is completed and lasting through the term of this permit, the permittee is authorized to inject only a mixture of saltwater leachate from the solid waste landfill collected in a retention pond on the plant site and fresh water runoff from the IMCO plant facilities in Morgantown, Kentucky. The injection well will be used only for disposal operations under the following conditions:

(a) Injection Zone

Injection shall be limited to the Knox Formation in the open hole interval between 4703 and 6450 feet below land surface.

(b) Injection Pressure Limitation

(i) The maximum allowable wellhead injection pressure for the IMCO Injection Well #1 will be 2700 psig. Upon approval by the Director, the permittee may inject at the maximum pressure attained during any step-rate test conducted on the injection well authorized by this permit. Step-rate injectivity test procedures must be approved by the Director prior to conducting the test and the test may be witnessed by EPA or an agent designated by EPA.

(ii) Injection at a pressure which initiates or propagates fractures in the injection zone, the confining zone, or causes the movement of injection or formation fluids into an underground source of drinking water is prohibited.

(iii) Injection between the outermost casing protecting underground sources of drinking water and the well bore is prohibited.

2. Annulus Operation

The annulus between the tubing and the long-string casing shall be filled with brine or other fluid as approved by the Director. The annulus pressure shall be maintained at 10 psig.

The annulus shall be monitored with a gauge designed to indicate both a vacuum (below atmospheric) and positive pressure (above atmospheric). The permittee shall comply with Part I, Section B, item 3, when a change in the annulus pressure of 13 psig occurs. The permittee shall provide an explanation to the Director for the change in pressure and measures that will be taken to restore annulus pressure to achieve compliance with this Section. If the cause of annulus pressure change is not corrected within 48 hours, the permittee shall cease injection unless such order to cease operation is waived by the Director.

3. Loss of Mechanical Integrity During Operation

The permittee shall cease injection if a loss of mechanical

integrity as defined at 40 C.F.R. §146.8 becomes evident during operation. Operation shall not be resumed until the permittee has complied with the provisions of Part II, Section G, of this permit regarding mechanical integrity demonstration and testing.

The permittee shall notify the Director of the loss of mechanical integrity in accordance with the reporting procedures in Part II, Section E, item 12(d). The Director may allow the owner or operator of the well to continue or resume injection if the owner or operator makes a satisfactory demonstration under 40 C. F. R. §144.51(g) (3) that there is no movement of fluid into or between the USDWs.

SECTION C. MONITORING REQUIREMENTS

1. Sampling and Analysis Methods

Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. Grab samples shall be used for the laboratory analysis of the physical and chemical characteristics as specified in Part I, Section C, item 3(a). Test methods and procedures shall be as specified at 40 C.F.R. §136.3 or 40 C.F.R. Part 261, Appendix III. When the analytical method for a particular parameter is not specified at either 40 C.F.R. §136.3 or 40 C.F.R. Part 261, Appendix III, the permittee must obtain the Director's approval of the method used. The permittee shall identify the types of tests and methods used to generate all monitoring data. Reports to be generated from monitoring data are specified in Part I, Section D.

2. Injection Operation Monitoring

The permittee shall monitor the operation of the injection well as follows:

<u>Parameter</u>	<u>Monitoring Frequency</u>
Injection Pressure (psig) at Wellhead	Continuously
Annulus Pressure (psig) at Wellhead	Continuously
Flow Rate (barrels/day) of Injected Fluid	Continuously

Cumulative Volume (barrels) of Injected Fluid	Continuously
Pressure Buildup in the injection Zone	Annually

3. Injection Fluid Analysis

The permittee shall conduct an injection fluid analysis at least once every three (3) months and whenever changes are made to the injection fluid. Analyses shall be made beginning within three (3) months from the effective date of this permit, or three (3) months from the most recent analysis, whichever is later. For wells that resume injection after having been shut in, the permittee will have thirty (30) days from the date injection resumes for the submission of the injection fluid analysis. An analysis must include:

- (a) pH, total dissolved solids, total suspended solids, specific gravity, barium, calcium, total iron, magnesium, sodium, bicarbonate, carbonate, chloride, sulfate, carbon dioxide, dissolved oxygen, aluminum, lead, cadmium and hydrogen sulfide.
- (b) A list of all chemicals and their composition used for any well stimulation and fracturing during that sampling period; and a list of any additives used and their chemical composition, including any inhibitors used to prevent scaling, corrosion, or bacterial growth. These lists should indicate the brand name of the product and the manufacturer.
- (c) Other physical and chemical characteristics of the injection fluid as required by the Director.

SECTION D. REPORTING REQUIREMENTS

1. Reports on Well Tests and Workovers

Within thirty (30) days after the completion of the activity, the permittee shall report to the Director the results of the following:

- (a) Mechanical integrity tests, other than those specified in Part I, Section A, item 3; and
- (b) Any well workover, logging or other test data, other

than those specified in Part I, Section A, item 3,
revealing downhole conditions.

2. Reporting of Monitoring Results

The permittee shall submit monitoring results on EPA Form 7520-11, whether injecting fluids or not, to the Director summarizing the results of the monitoring as specified in Part I, Section C of this permit. The first monitoring report shall be made within three (3) months from the effective date of this permit, or three (3) months from the most recent analysis, whichever is later. Subsequently, the monitoring report shall cover the period from January 1 through March 31, April 1 through June 30, July 1 through September 30, and October 1 through December 31. All reports submitted to the Director shall indicate the status of the injection well, i.e., active, shut-in, or plugged and shall be submitted with 30 days from the close of the reporting period.

Copies of the monitoring results required by Part I and all other reports required by Part II shall be submitted to the Director at the following address:

U. S. Environmental Protection Agency
Region 4, Water Management Division
Ground Water/Drinking Water Branch
Ground Water & UIC Section
61 Forsyth Street, SW
Atlanta, Georgia 30303-8960

3. Reporting of New Wells Drilled Within the Area of Review (AOR)

Within ten (10) days after spud date, the permittee shall report to the Director by certified mail, return receipt requested, the construction plans for any new well that will penetrate the confining zone or injection zone that is listed in the public records or otherwise known to the permittee to be within the area of review.

If the construction of the new well will not protect USDWS from contamination, the Director may terminate the permit under 40 C.F.R. §14.40(a)(3), if he or she determines that continued injection may endanger human health or the environment.

SECTION E. PLUGGING AND ABANDONMENT PLAN

Plugging and abandonment (P&A) of the permitted injection well shall be in accordance with Part II, Section F, of this permit and 40 C.F.R. §146.10.

During the operating life of the permitted well, this injection facility may be screened for technologically enhanced naturally occurring radioactive material (NORM) by EPA or another party. If the permittee is notified by a party other than EPA, or becomes aware at any time that elevated levels of NORM have been detected at this injection facility, the permittee must notify EPA in writing of that fact no later than 45 days prior to the permittee's intent to P&A the well. EPA may require the permittee to revise the P&A plan to ensure the safe disposal and proper management of elevated levels of NORM waste.

The plugging of this injection well shall be performed in the manner described Attachment Q of the permit application.

PART II
GENERAL PERMIT COMPLIANCE

A. EFFECT OF PERMIT

The permittee is allowed to engage in underground injection in accordance with the conditions of this permit. The permittee, authorized by this permit, shall not construct, operate, maintain, convert, plug, abandon, or conduct any other injection activity in a manner that allows the movement of fluid containing any contaminant into an Underground Source of Drinking Water (USDW), if the presence of that contaminant may cause a violation of any primary drinking water regulation under 40 CFR Part 142 or may otherwise adversely affect the health of persons. Any underground injection activity not specifically authorized in this permit is prohibited. Compliance with this permit does not constitute a defense to any action brought under the Safe Drinking Water Act (SDWA), or any other common or statutory law or regulation. Issuance of this permit does not convey property rights of any sort or any exclusive privilege; nor does it authorize any injury to persons or property, or invasion of other private rights, or any infringement of State or local law or regulations. Nothing in this permit shall be construed to relieve the permittee of any duties under applicable regulations.

B. PERMIT ACTIONS

1. Modification, Revocation, Reissuance and Termination. The Director may, for cause or upon request from the permittee, modify, revoke and reissue, or terminate this permit in accordance with 40 CFR §§144.12, 144.39, and 144.40, including but not limited to the following:

(a) Alterations. There are material and substantial alterations or additions to the permitted facility or activity which occurred after permit issuance which justify the application of permit conditions that are different or absent in the existing permit.

(b) Information. The Director has received information which was not available at the time of permit issuance (other than revised regulations, guidance, or test methods) and would have justified the application of different permit conditions at the time of issuance. For UIC area permits, this cause shall include any information indicating that cumulative effects on the environment are unacceptable.

(c) New regulations. The standards or regulations on which the permit was based have been changed by promulgation of newer or amended standards or regulations or by judicial decision after the permit was issued.

- (d) Compliance schedules. The Director determines good cause exists for modification of a compliance schedule, such as an act of God, strike, flood, or material shortage or other events over which the permittee has little or no control and for which there is no reasonably available remedy.
- (e) Proposed transfer. The Director receives notification of a proposed transfer of the permit.
- (f) Noncompliance. Noncompliance by the permittee with any condition of the permit.
- (g) Relevant facts. The permittee's failure in the application or during the permit issuance process to disclose fully all relevant facts, or the permittee's misrepresentation of any relevant facts at any time.
- (h) Endangerment. A determination that the permitted activity endangers human health or the environment and can only be regulated to acceptable levels by permit modification or termination.

Also, the permit is subject to minor modifications for cause as specified in 40 CFR §144.41. The filing of a request for a permit modification, revocation and reissuance, or termination, or the notification of planned changes, or anticipated noncompliance on the part of the permittee does not stay the applicability or enforceability of any permit condition.

The submittal of an updated application may be required prior to the Director granting a request for permit modification.

- 2. Transfer of Permits. This permit is not transferable to any person except after notice to and approval by the Director, and in compliance with the requirements and conditions of 40 CFR §144.38.

The Director may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the SDWA.

This permit may be transferred to a new owner or operator by modification according to 40 CFR §144.41(d), where the Director determines that no other change in the permit is necessary, provided that written agreement containing a specific date for transfer of permit responsibility, coverage, and liability between the current and new permittee has been submitted to the Director.

C. SEVERABILITY

The provisions of this permit are severable, and if any provision of this permit or the application of any provision of this permit to any circumstances is held invalid, the application of such provision to other circumstances and the remainder of this permit shall not be affected thereby.

D. CONFIDENTIALITY

In accordance with 40 CFR Part 2, any information submitted to EPA pursuant to this permit may be claimed as confidential by the submitter. Any such claim must be asserted at the time of submission by stamping the words "confidential-business information" on each page containing such information. If no claim is made at the time of submission, EPA may make the information available to the public without further notice. If a claim is asserted, the information will be treated in accordance with the procedures in 40 CFR Part 2 (Public Information). Claims of confidentiality for the following information will be denied:

- 1) The name and address of any permit applicant or permittee;
- 2) Information which deals with the existence, absence or level of contaminants in drinking water.

E. DUTIES AND REQUIREMENTS

1. Duty to Comply. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the SDWA and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application; except that the permittee need not comply with the provisions of this permit to the extent and for the duration such noncompliance is authorized in an emergency permit under 40 CFR §144.34.

2. Penalties for Violations of Permit Conditions. Any person who violates a permit requirement is subject to civil penalties and other enforcement actions under the SDWA which may include criminal prosecution.

3. Continuation of Expiring Permits.

- (a) Duty to Reapply. If the permittee wishes to continue an activity

regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit.

- (b) Permit Extensions. The conditions of an expired permit may continue in force in accordance with 5 U.S.C. 558(c) until the effective date of the new permit, if:

- (1) The permittee has submitted a timely application which is a complete application for a new permit; and
- (2) The Director, through no fault of the permittee, does not issue a new permit with an effective date on or before the expiration date of the previous permit, and
- (3) The new permit has not been denied, or if a denial has been appealed, final agency action has not occurred in accordance with 40 CFR §124.19(f)(1).

- (c) Effect. Permits continued under 5 U.S.C. 558(c) remain fully effective and enforceable.

- (d) Enforcement. When the permittee is not in compliance with the conditions of the expiring or expired permit, the Director may choose to do any or all of the following:

- (1) Initiate enforcement action based upon the permit which has been continued;
- (2) Issue a notice of intent to deny the new permit. If the permit is denied, the owner or operator would then be required to cease the activities authorized by the continued permit or be subject to enforcement action for operating without a permit;
- (3) Issue a new permit under 40 CFR Part 124 with appropriate conditions; or
- (4) Take other actions authorized by Underground Injection Control regulations.

- (e) State Continuation. An EPA issued permit does not continue in force beyond its expiration date under Federal law if at that time a

State has primary enforcement authority. A State authorized to administer the UIC program may continue either EPA or State issued permits until the effective date of the new permits, if State law allows. Otherwise, the facility or activity is operating without a permit from the time of expiration of the old permit to the effective date of the State issued new permit.

4. Need to Halt or Reduce Activity not a Defense. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

5. Duty to Mitigate. The permittee shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this permit.

6. Proper Operation and Maintenance. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of this permit.

7. Duty to Provide Information. The permittee shall furnish to the Director, within a time specified, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

8. Inspection and Entry. The permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law to:

- (a) Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
- (b) Have access to and copy, at reasonable times, any records that must

be kept under the conditions of this permit;

(c) Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

(d) Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by SDWA, any substances or parameters at any location.

9. Property Rights. This permit does not convey any property rights of any sort, or any exclusive privilege.

10. Monitoring and Records.

(a) Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

(b) The permittee shall retain records of all monitoring information, including the following:

(i) Calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three (3) years from the date of the sample, measurement, report, or application. This period may be extended by request of the Director at any time; and

(ii) The nature and composition of all injected fluids until three (3) years after the completion of any plugging and abandonment procedures specified under 40 CFR §144.52(a)(6), or under Part 146 Subpart as appropriate. The Director may require the owner or operator to deliver the records to the Director at the conclusion of the retention period. The owner or operator shall continue to retain the records after the three (3) year retention period unless he delivers the records to the Director or obtains written approval from the Director to discard the records.

(c) Records of monitoring information shall include:

- (i) The date, exact place, and time of sampling or measurements;
- (ii) The individual(s) who performed the sampling or measurements;
- (iii) The date(s) analyses were performed;
- (iv) The individual(s) who performed the analyses;
- (v) The analytical techniques or methods used; and
- (vi) The results of such analyses.

11. Signatory Requirements.

- (a) All reports or other information submitted to the Director shall be signed and certified in accordance with 40 CFR § 144.32, as follows:

- (1) For a corporation: by a responsible corporate officer. For the purpose of this permit, a responsible corporate officer means: (1) a president, secretary, treasurer or vice president of the corporation in charge of a principal business function, or any other person who performs similar policy - or decision making functions for the corporation, or (2) the manager of one or more manufacturing, production or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding 25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporation procedures.

- (2) For a partnership or sole proprietorship: by a general partner of the proprietor, respectively; or

- (3) For a municipality, State, federal, or other public agency: by either a principal executive officer or

ranking elected official; or

(4) A duly authorized representative.

(b) A person is a duly authorized representative only if:

(1) The authorization is made in writing by a person described above;

(2) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, or position of equivalent responsibility. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.); and

(3) The written authorization is submitted to the Director.

(c) If an authorization under paragraph (b) above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph (b) of this section must be submitted to the Director prior to or together with any reports, information, or applications to be signed by an authorized representative.

(d) Any person signing a document under paragraphs 11(a) or 11(b) of this section shall make the following certification:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information,

including the possibility of fine and imprisonment for knowing violations.”

12. Reporting Requirements.

- (a) Planned Changes. The permittee shall give written notice to the Director, as soon as possible, of any planned physical alterations or additions to the permitted facility.
- (b) Anticipated Noncompliance. The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.
- (c) Compliance Schedules. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 30 days following each schedule date.
- (d) Twenty-four Hour Reporting. The permittee shall report any noncompliance which may endanger health or the environment, including:
 - (i) Any monitoring or other information which indicates that any contaminant may cause an endangerment to a USDW; or
 - (ii) Any noncompliance with a permit condition or malfunction of the injection system which may cause fluid migration into or between USDWs.

Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within five (5) days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause, the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

(e) Other Noncompliance. The permittee shall report all instances of noncompliance not reported at the time monitoring reports are submitted. The reports shall contain the information listed in Part II, Section E, Item 12(d)(2) above.

(f) Other Information. When the permittee becomes aware that he failed to submit any relevant facts in the permit application or submitted incorrect information in a permit application or in any report to the Director, the permittee shall promptly submit such facts or information.

F. PLUGGING AND ABANDONMENT

1. Notice of Plugging and Abandonment. The permittee shall notify the Director no later than 45 days before conversion or abandonment of the well. The Director may allow a shorter notice period upon written request.

2. Plugging and Abandonment. The permittee shall plug and abandon the well consistent with 40 CFR §146.10, as provided for in the plugging and abandonment plan incorporated as part of this permit. Plugging and abandonment shall be completed to ensure that fluids are not allowed to move either into a USDW of from one USDW to another.

Revisions to the Plugging and Abandonment Plan must be submitted to the Director no less than 45 days prior to the plugging and abandonment. The Director must approve the revision prior to the start of plugging operations.

Within 60 days after plugging the well, or at the time of the next quarterly report (whichever is less), the owner or operator shall submit a report to the Director. If the quarterly report is due less than 15 days before completion of plugging, then the report shall be submitted within 60 days. The report shall be certified as accurate by the person who performed the plugging operation. Such report shall consist of either:

(a) A statement that the well was plugged in accordance with the plan previously submitted to the Director; or

(b) If the actual plugging differed from the approved plan, a statement defining the actual plugging and why the Director should approve such deviation. Any deviation from a previously approved plan may be cause for the Director to require the owner or operator to

replug the well or pursue enforcement action.

3. Inactive Wells. After cessation of injection for two (2) years, the permittee shall plug and abandon the well in accordance with the plan unless he:

- (a) Provide notice to the Director including a demonstration that the well will be used in the future; and

- (b) Describe actions or procedures, which are deemed satisfactory by the Director, that the permittee will take to ensure that the well will not endanger USDWs during the period of temporary abandonment. These actions and procedures may include, but are not limited to, a demonstration of mechanical integrity and shall include compliance with the technical and reporting requirements applicable to active injection wells unless waived, in writing, by the Director.

G. MECHANICAL INTEGRITY

1. Standards. The owner or operator of a Class I, II or III well permitted under this part shall establish prior to commencing injection or on a schedule determined by the Director, and thereafter maintain mechanical integrity as defined in 40 CFR § 146.8. The Director may require by written notice that the owner or operator comply with a schedule describing when mechanical integrity demonstrations shall be made.

2. Prohibition Without Demonstration. The permittee shall not commence or continue injection activity after the effective date of this permit unless the permittee has demonstrated that the well covered by this permit has mechanical integrity in accordance with 40 CFR § 146.8 and the permittee has received written notice from the Director that such demonstration is satisfactory.

3. Subsequent Mechanical Integrity Demonstrations. A demonstration of mechanical integrity in accordance with 40 CFR § 146.8 shall be made no later than five (5) years from the date of the last approved demonstration. Mechanical integrity shall also be demonstrated at any time the tubing is removed from the well, the packer is reset, or a loss of mechanical integrity becomes evident during operation. Furthermore, the Director may by written notice require the permittee to demonstrate mechanical integrity at any time. The permittee shall notify the Director of his intent to demonstrate mechanical integrity at least 30 days prior to such demonstration. The Director may allow a shorter time period if it would be sufficient to enable EPA to adequately respond. The permittee shall report the

results of a mechanical integrity demonstration within 90 days after completion and in accordance with Part II, Section E, Item 11.

4. Loss of Mechanical Integrity. When the Director determines that a Class I, II, or III well lacks mechanical integrity pursuant to 40 CFR § 146.8, he shall give written notice of his determination to the owner or operator. Unless the Director requires immediate cessation, the owner or operator shall cease injection into the well within 48 hours of receipt of the Director's determination. The Director may allow plugging of the well pursuant to the requirements of 40 CFR § 146.10 or require the permittee to perform such additional construction, operation, monitoring, reporting and corrective action as is necessary to prevent the movement of fluid into or between USDWs caused by the lack of mechanical integrity. The owner or operator may resume injection upon written notification from the Director that the owner or operator has demonstrated mechanical integrity pursuant to 40 CFR § 146.8.

The Director may allow the owner or operator of a well which lacks mechanical integrity pursuant to 40 CFR § 146.8.(a)(1) to continue or resume injection, if the owner or operator has made a satisfactory demonstration that there is no movement of fluid into or between USDWs.

5. Test Methods to be Used for Mechanical Integrity Test (MITT). A plan for logging and testing the well for mechanical integrity shall be prepared and submitted for the Director's approval at least 60 days prior to each proposed MITT demonstration date. The Director may allow a shorter time period if it would be sufficient to enable EPA to adequately respond.

The plan shall propose logs and tests specified in 40 CFR § 146.8 (as amended from time to time by EPA to include additional approved logs and tests, as published in the Federal Register). The plan shall also propose standards that will be used for evaluating the results of logging and testing. Mechanical integrity will be confirmed if the well logs and test data meet or exceed the standards approved as a result of the Director's review of the plan.

H. FINANCIAL RESPONSIBILITY

1. Financial Responsibility. The permittee, including the transferor of a permit, is required to demonstrate and maintain financial responsibility and resources to close, plug, and abandon the underground injection operation in a manner prescribed by the Director until:

(A) The well has been plugged and abandoned in accordance with an approved

plugging and abandonment plan pursuant to 40 CFR §§144.51(o) and 146.10, and submitted a plugging and abandonment report pursuant to 40 CFR §144.51(p); or

(B) The well has been converted in compliance with the requirements of 40 CFR §144.51(n); or

(C) The transferor of a permit has received notice from the Director that the owner or operator receiving transfer of the permit, the new permittee, has demonstrated financial responsibility for the well.

The permittee shall show evidence of such financial responsibility to the Director by the submission of a surety bond, or other adequate assurance, such as a financial statement or other materials acceptable to the Director. The Director may on a periodic basis require the holder of a lifetime permit to submit an estimate of the resources needed to plug and abandon the well revised to reflect inflation of such costs, and a revised demonstration of financial responsibility, if necessary. The owner or operator of a well injecting hazardous waste must comply with the financial responsibility requirements of subpart F of this part.

2. Insolvency. In the event of:

- (a) the bankruptcy of the trustee or issuing institution of the financial mechanism, or
- (b) suspension or revocation of the authority of the trustee institution to act as trustee, or
- (c) the institution issuing the financial mechanism loses its authority to issue such an instrument, the permittee must notify the Director, within ten (10) business days. The owner or operator must establish other financial assurance or liability coverage acceptable to the Director, within 60 days after such an event.

An owner or operator must also notify the Director by certified mail of the commencement of voluntary or involuntary proceedings under Title 11 (Bankruptcy), U.S. Code naming the owner or operator as debtor, within ten (10) business days after commencement of the proceeding. A guarantor of a corporate guarantee must make such a notification if he is named as debtor, as required under the terms of the guarantee.

An owner or operator who fulfills the requirements of 40 CFR §144.63 by obtaining a letter of credit, surety bond, or insurance policy will be deemed to be

without the required financial assurance or liability coverage in the event of bankruptcy, insolvency, or a suspension or revocation of the license or charter of the issuing institution. The owner or operator must establish other financial assurance or liability coverage within 60 days after such an event.

I. DEFINITIONS

All terms used in this permit, not specifically defined in the permit, are defined at 40 CFR Parts 144, 145, 146 and 147.

ATTACHMENT A
AREA OF REVIEW

The area of review chosen for the Aleris injection well is fixed radius of 1/4 mile from the well site. The well site and the area of review are shown in Figure B-1.

ATTACHMENT B

MAPS OF WELLS/AREA AND AREA OF REVIEW

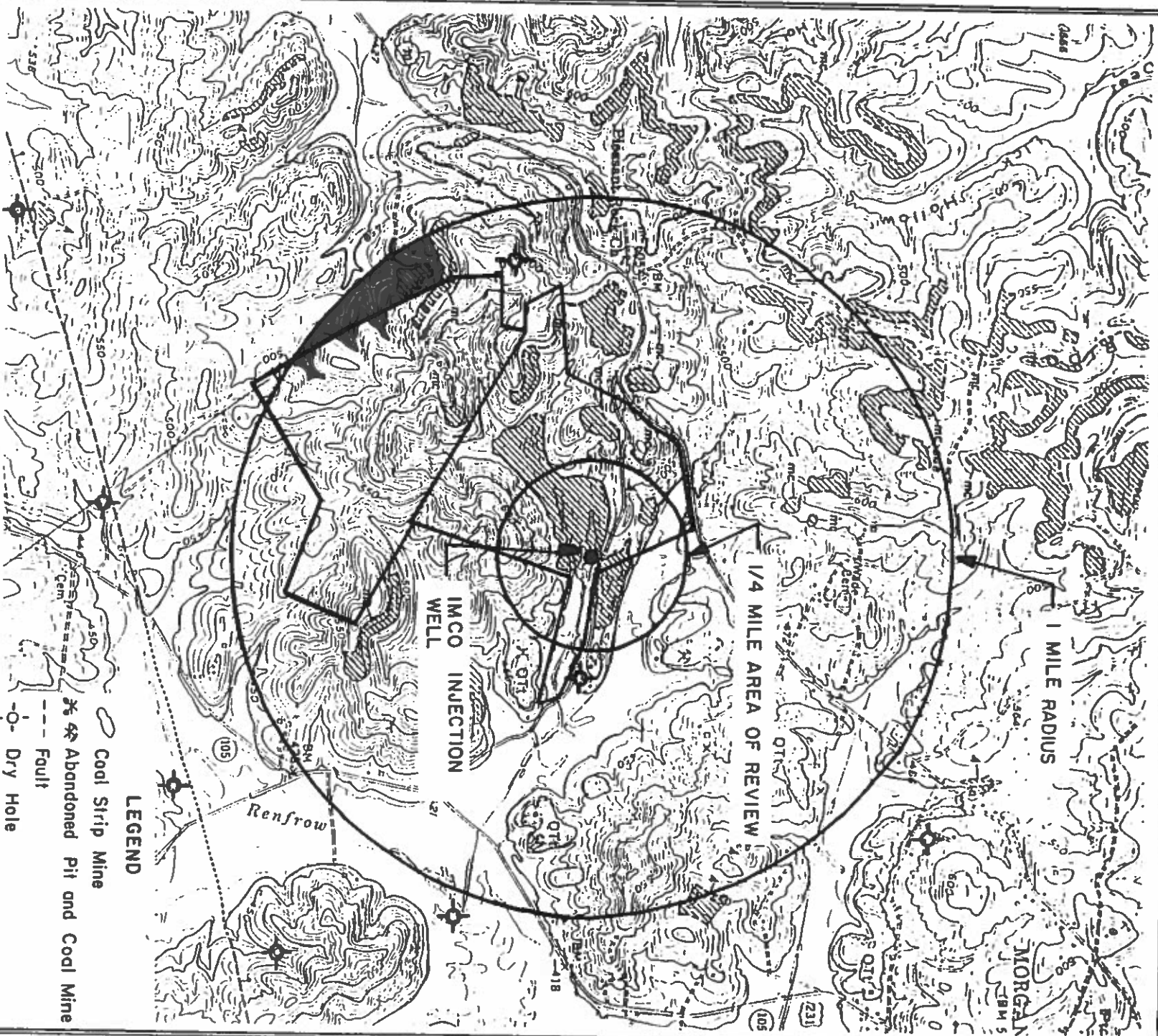
Figure B-1 shows the location of the injection well, property line, the area of review and the 1-mile radius. The map also shows the strip mines (coal), gravel pits and wells drilled in the vicinity of the injection well. The Aleris plant and landfill facilities are built near and on an abandoned strip mine.

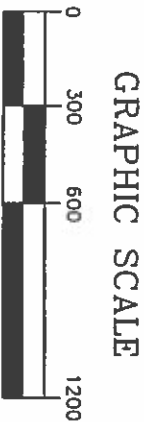
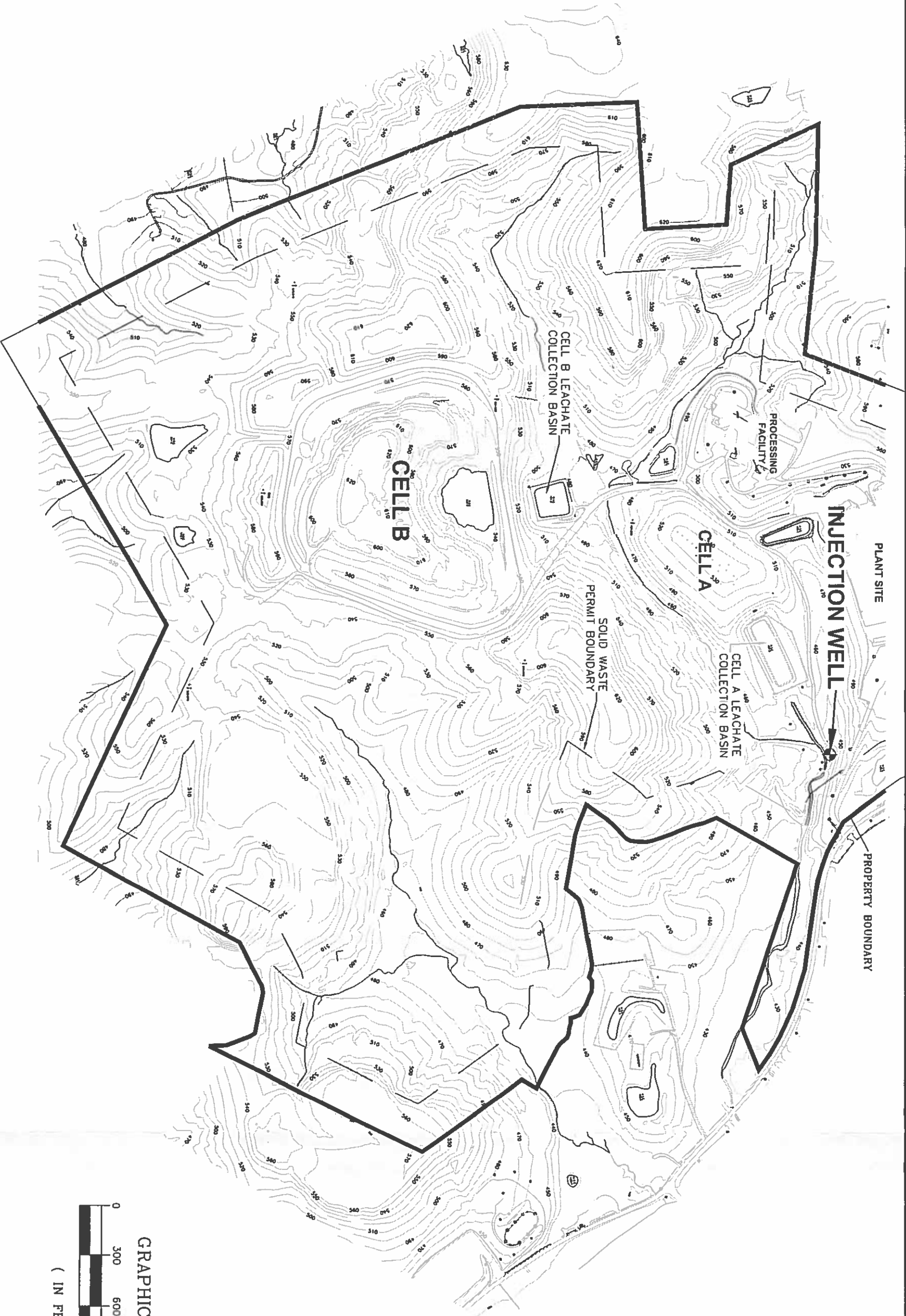
A possible fault is mapped about 1.5 miles south of the injection well (Figure B-1).

Two small streams are present within the area of review. One of these is to the north of the injection well and the other south of it. These two streams flow east and southeast to merge to Renfrow Creek.

No drinking water wells are located in the area of review. There are four drinking water wells in the 1/2-mile radius of the Aleris property. The data pertinent to these wells are shown below:

- 1. Exie Hawes, 1897 Rochester Road
Located 1,800 feet north of the site
Depth of the well: 25 feet
- 2. Casey Johnson, 437 Garden Camp Road
Located 2,000 feet east-southeast of the site
Depth of well: 38 feet
- 3. Hal and Betty Neal, P.O. Box 21
Located 2,200 feet southeast of the site
Depth of well: 75 feet
- 4. Henry Meredith, Jr., 403 Garden Camp Road
Located 1,600 feet southeast of the site
Depth of well: 120 feet

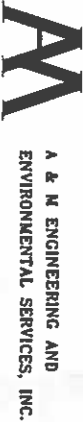




(IN FEET)

GENERAL NOTES

REVISIONS			
NO	DESCRIPTION	BY	DATE



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ENGINEERING - ENVIRONMENTAL - CONSTRUCTION

DRAWN	DATE	CHECKED BY	DATE	DATE	DATE
	3/28/2010				

ALERIS RECYCLING, INC.
INJECTION WELL
SITE LAYOUT

MORGANTOWN, KENTUCKY

APPROVED BY	SCALE	PROJECT NUMBER	DRAWING NUMBER	REV.
	NOTED		FIGURE B-2	

Figure B-2 shows a detailed topographic map of the Aleris property and the facilities. The plant site is located to the north of the property and non-hazardous solid waste landfill is constructed in the south. The landfill has a double synthetic liner and is equipped with fence drain, leachate system and leak detection system. The leachate from the landfill is collected in a pond with a synthetic line east of the landfill (Figure B-2). Five groundwater monitor wells were installed for the landfill and leachate collection pond; these are shown on Figure B-2.

OK ✓

ATTACHMENT C

CORRECTIVE ACTION PLAN AND WELL DATA

5 Monitor Wells -

No wells are present in the 1/4 mile radius area of review with the exception of the shallow (40' to 60' deep) monitor wells of the Aleris solid waste landfill.

In a 1-mile-radius area, there are two deep wells, but in a 1.5-mile-radius, seven wells (Fig. B-1). These wells, drilled for oil and gas, are all dry and abandoned. The data from these wells are tabulated in Table C-1 and copies of the records are included as Appendix A. None of the wells penetrated the injection zone (Cambro-Ordovician carbonates), and the confining zone (Devonian New Albany Shale).

The only well to penetrate the proposed injection zone is located about three miles northwest of the Aleris injection well in Section 9, 1-33, Butler County (G. Orange #1). This well is also dry and abandoned.

Therefore, there is no need for a corrective action plan.

OK / *un*

TABLE C-1
LIST OF WELLS IN 1.5-MILE-RADIUS OF
INJECTION WELL
MORGANTOWN (BUTLER COUNTY), KENTUCKY

Well Name	Location	Total Depth (ft.)	Drilling Date	Formation at TD	Status	Plugging
1)Paul Ingram #1	Sec.12, I-34, 2000' FNL, 2200'FWL	1770	1976-78	Mississippian Ls.	Dry	Yes
2)Producers Pipe Line #1	Sec.8, I-34, 1300' FSL, 750' FEL	1544	1955-56	Mississippian Ls.	Dry	Yes
3)Forsythe-Nel #1	Sec.12, I-34, 11950' FSL, 9310 FEL	1114	?	Mississippian Ls.	Dry	Yes
4)George Nelson #1	Sec. 18, I-34, 9800' FSL, 8800' FEL	1511	1956	Mississippian Ls.	Dry	Yes
5)George Nelson #1	Sec.18, I-34, 8200' FSL, 11200' FEL	934	1957	Mississippian Sh-Ss	Dry	Yes
6)Hopen Shearer #1	Sec. 17, I-34	940	?	Mississippian Ls.	Dry	Yes
7)Ruby Wade #1	Sec.13, I-34, 14240' FSL, 12740' FEL	850	1962	Mississippian Ls.	Oil	?

ATTACHMENT D

USDW (Underground Sources of Drinking Water)

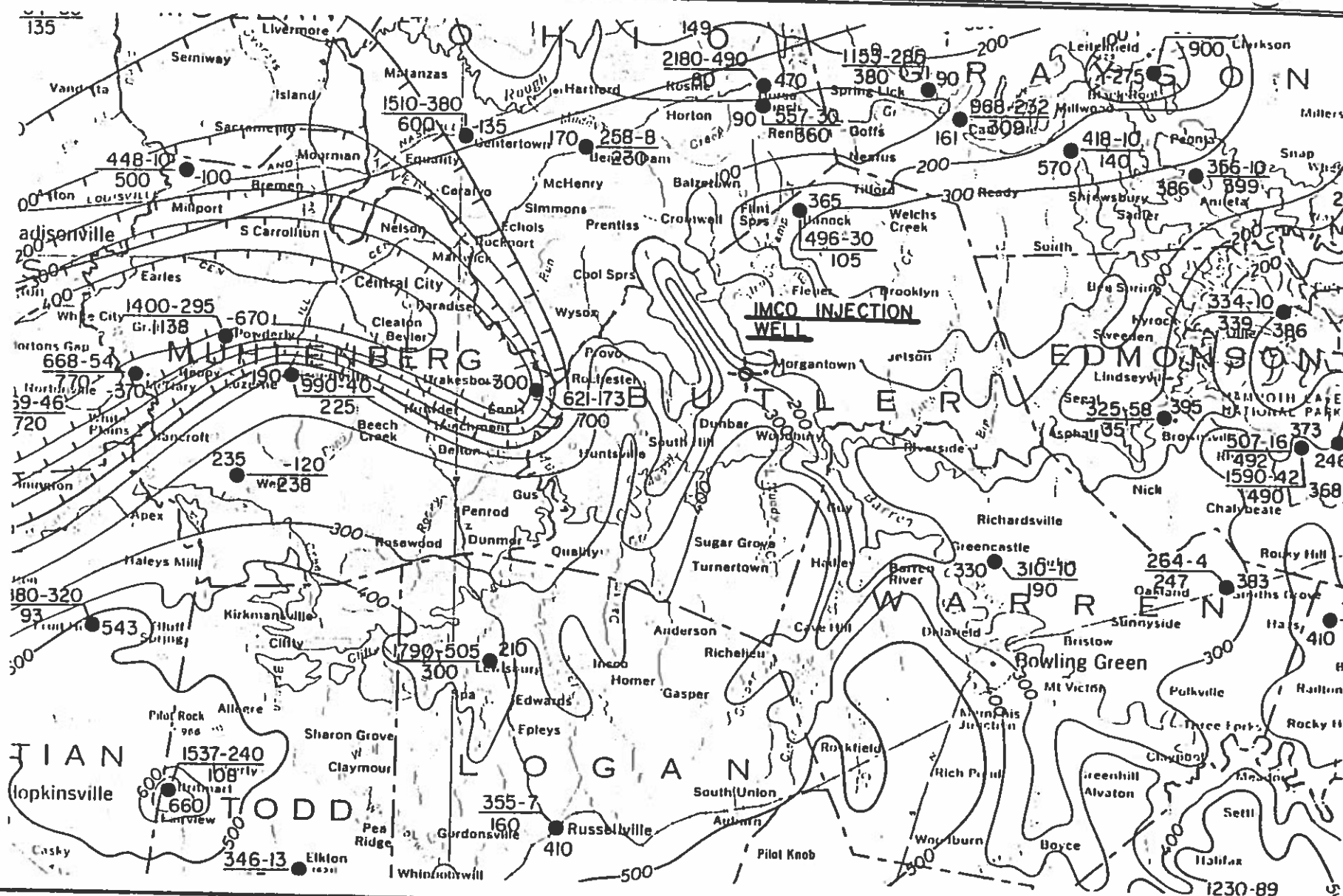
Drinking water sources in the vicinity of the Aleris site are the Pennsylvanian sandstone units and the alluvial deposits of the Green River and its tributaries.

Water-bearing Pennsylvanian sandstone units range in depth from 20 feet to 300 feet in the vicinity of the Aleris injection well. In the R. Wade #1 well (Section 13, 1-34) located 2,000 feet east of the Aleris well, the water-bearing Pennsylvanian sandstones were encountered at a depth of 60 feet, 205-250 feet and 300-316 feet. The bottom of the lower most sandstone has a datum elevation of 119 feet above mean sea level. Well record of the R. Wade #1 is included in Appendix A. In the Aleris injection well, two sandstone zones with low conductivity, high resistivity are encountered at depths of 96-116 and 230-260 feet.

Figure D-1 is a map of fresh saline water interface of Butler County and surrounding counties, taken from H. T. Hopkins (1966). According to this map, the fresh saline water interface in the vicinity of the Aleris injection well is at datum elevation of 200-250 feet mean sea level.

The surface casing (9 5/8") is set at a 471 foot depth, about 271 feet below the fresh saline water interface and about 211 feet below the water-bearing sandstone unit of Pennsylvanian.

Figure D-2 show the flood prone areas in the vicinity of the Aleris injection well.



SCALE 1"=8miles

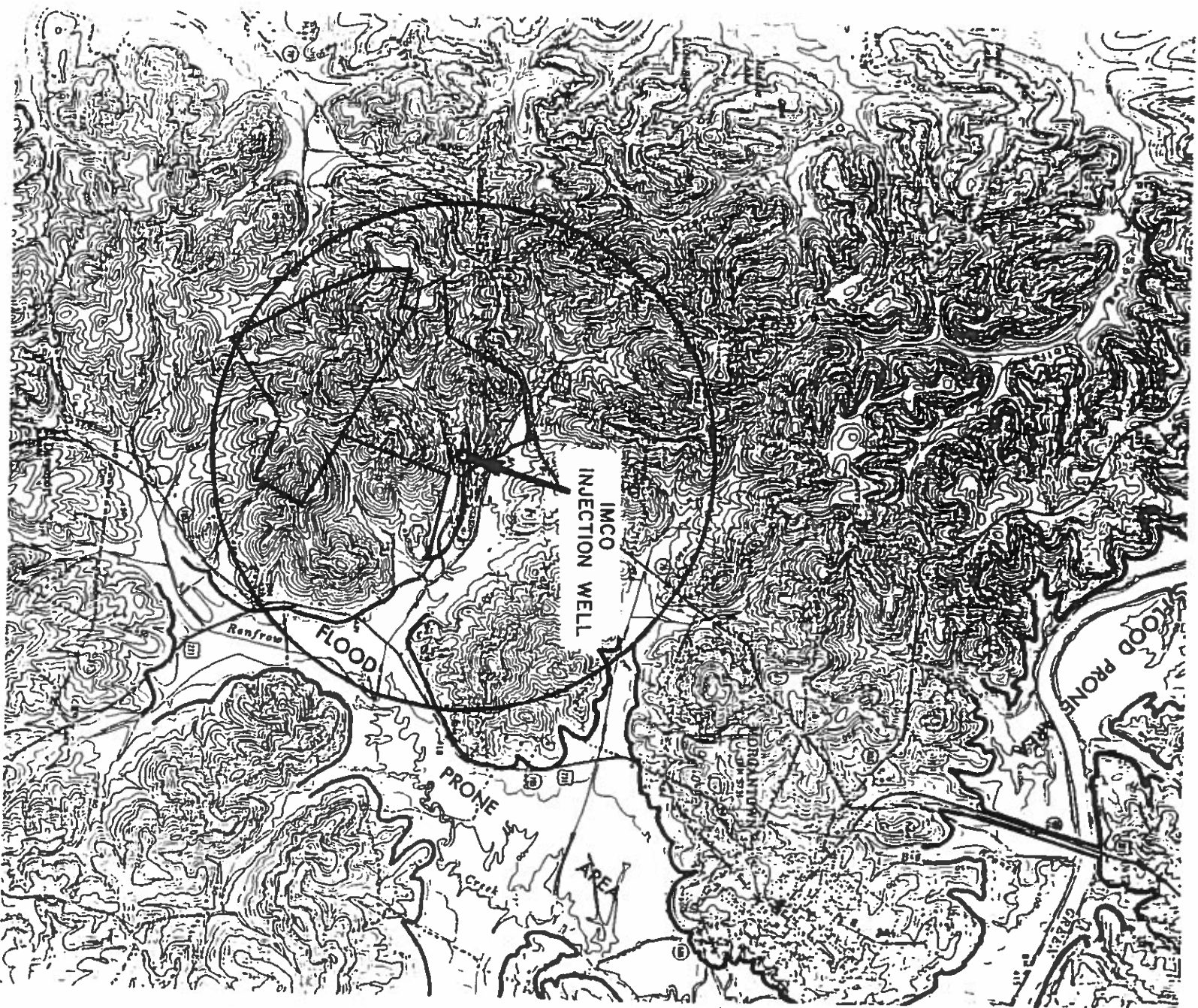
(FROM H.T. HOPKINS, 1966)



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FRESH SALINE WATER INTERFACE
CONTOUR MAP OF BUTLER COUNTY

FIGURE D-1



A
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MAP OF FLOOD PRONE AREAS IN THE VICINITY
OF IMCO SITE

SCALE: 1"=3000' DATE FIGURE D-2

APPROVED BY DRAWN BY DRAWING NO.

ATTACHMENT E

NOT APPLICABLE

ATTACHMENT F

MAPS AND CROSS-SECTIONS OF GEOLOGIC STRUCTURE OF AREA

Regional Geologic Setting:

The site of the Aleris injection well is located in the southeastern flank of the Moorman Syncline (Figure F-1). The Moorman Syncline is part of the Eastern Interior basin and it is bounded by two major fault zones, the Rough Creek fault zone to the north and the Pennyrite fault zone to the south. The Moorman Syncline trends east-west and deepens westward. The syncline is filled with over 10,000 feet thick sediments of Paleozoic and possibly Precambrian.

The Rough Creek fault zone strikes east-west for over 175 miles in western Kentucky and extends into southern Illinois. The fault zone is about 15.5 miles wide. The fault zone consists of both high angle normal faults and reverse faults. The highest cumulative displacement (throw) across the fault zone is about 2,000-2,500 feet, down to the south.

The Pennyrite fault zone also extends east-west, and it terminates just east of Butler County.

The Pennyrite fault zone is less pronounced than the Rough Creek fault zone. The Pennyrite fault zone consists of vertical to high-angle normal faults with down-to-the-north displacement.

The cumulative displacement across the fault zone is about 500 feet, but it may increase to 1,000 feet in extreme western Kentucky.

Stratigraphy of the Site

The consolidated surface strata at the site are of the Pennsylvanian Tradewater Formation. The section contains coal beds which were strip-mined at the site.

The stratigraphic column of the site was prepared by using data from the Aleris well, the wells drilled in the vicinity of the Aleris injection well and from the deep wells in the region as well as

Generalized Structure Map of Kentucky

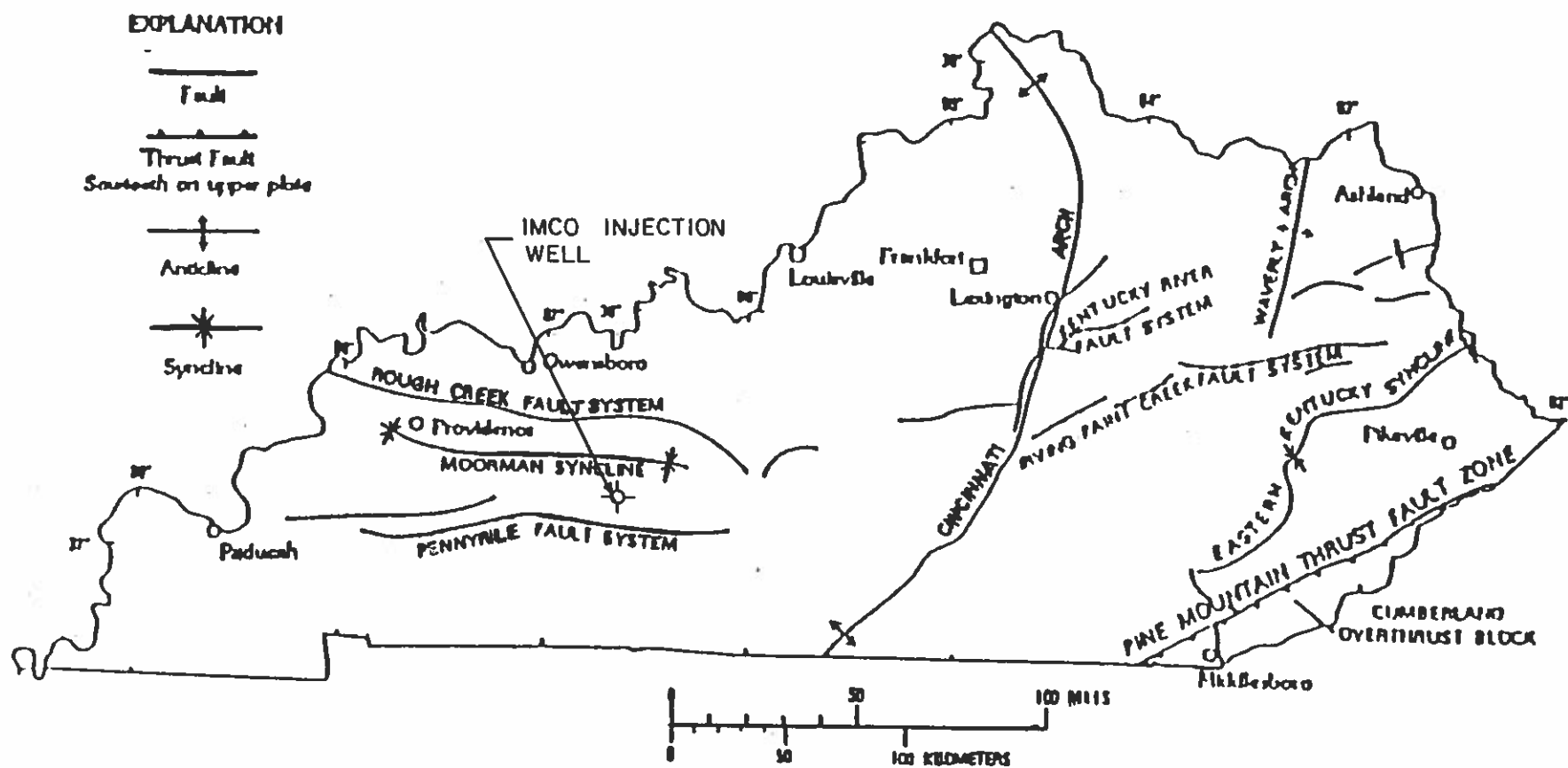


FIGURE F-1



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information from Gildersleeve, 1972, Schwalb, 1975 and Townsend and Cordivola, 1982. Figure F-2 shows the stratigraphic column of the site.

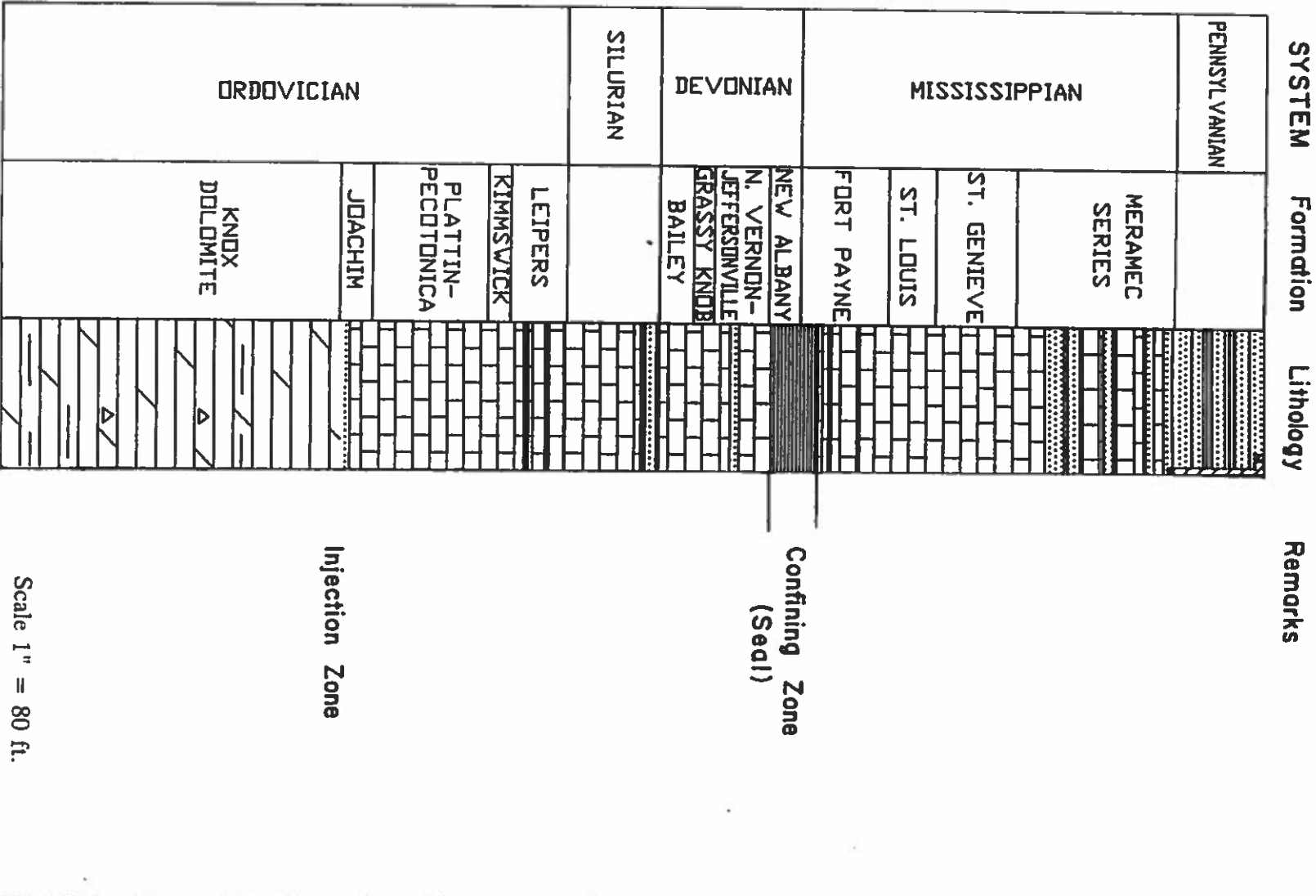
The Pennsylvanian section (Tradewater and Caseyville Formation) is composed of shale, siltstone, and sandstone with coal seams and occasional thin limestone beds. The coal seams range from 0-48 inches in thickness. The coal previously exposed at the surface in the area of review have been mined by strip-mining. The total thickness of the Pennsylvanian section in the area of review is about 525 feet and 446 feet in the well. An erosional unconformity separates the Pennsylvanian strata from underlying Mississippian rocks.

The Mississippian rocks are exposed about four miles south of the injection well site, along the Pennyrile fault zone. The upper Mississippian section (Chester Series) is composed of alternating limestone, shale, and sandstone. The thickness of the Chester Series is about 925 feet and only 764 feet in the subject well. The units of the Chester Series have produced most of the gas and oil in Butler County.

The lower Mississippian section (Kinderhook-Osage-Meramec Series) is mainly limestone with thin shale streaks, with the exception of the lower most two formations, Fort Payne and New Providence. The Fort Payne Formation consists of limestone in the upper-two-thirds and mainly shale limestone. The total thickness of Kinderhook-Osage-Meramec Series is about 925 feet in the area, and 1123 feet thick in the well. The Kinderhook Series conformably overlies the Upper Devonian New Albany (Chattanooga) Shale.

The New Albany (Chattanooga) Shale consists of dark brown to black, carbonaceous and pyritic shale. The shale contains spores and amber and is silty in some zones. The New Albany Shale widely extends in the subsurface and it is 162 feet thick at the site. The thickness increases westward. The New Albany Shale unconformably overlies the older Devonian rocks. The New Albany Shale together with the overlying shaley Fort Payne sections form a thick (300 feet) confining layer in the injection well.

The Lower-Middle Devonian section is mainly limestone with a thickness of 548 feet. The limestone is generally light colored and it is glauconitic, sandy, cherry or dolomitic in some zones.



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STRATIGRAPHIC COLUMN

SCALE:

DATE

FIGURE F-2

APPROVED BY

DRAWN BY

DRAWING NO.

The Silurian section is mainly carbonate with shale units in the upper part. The carbonates are usually light colored limestone and dolomite. The thickness of the Silurian section is 487 feet.

The Silurian rocks unconformably overlie the Ordovician Leipers Formation.

The Upper Ordovician Leipers Formation varies in lithology in the region. In the injection well, it consists of gray, dark gray, calcareous shale, dolomitic limestone, limestone and siltstone. The siltstone is penetrated at the base of the Leipers Formation and in a well located about nine miles northwest of the injection well site. The Leipers is 270 feet thick.

Below the Leipers Formation, the Ordovician section (Kimmswick, Platin, Pectonica, and Joachim Formations) is generally limestone and dolomite. The Ordovician-Cambrian Knox Group unconformably underlies the Joachim Formation. The Knox Group is mainly dolomite.

The injection well is completed in the Knox Group at a depth of 4700-6450 feet. Underlying the Knox Group, at least 2000 feet thick sedimentary section of Cambrian age is expected.

Local Structure of the Area of Review and Its Surroundings:

Knox
dolomite

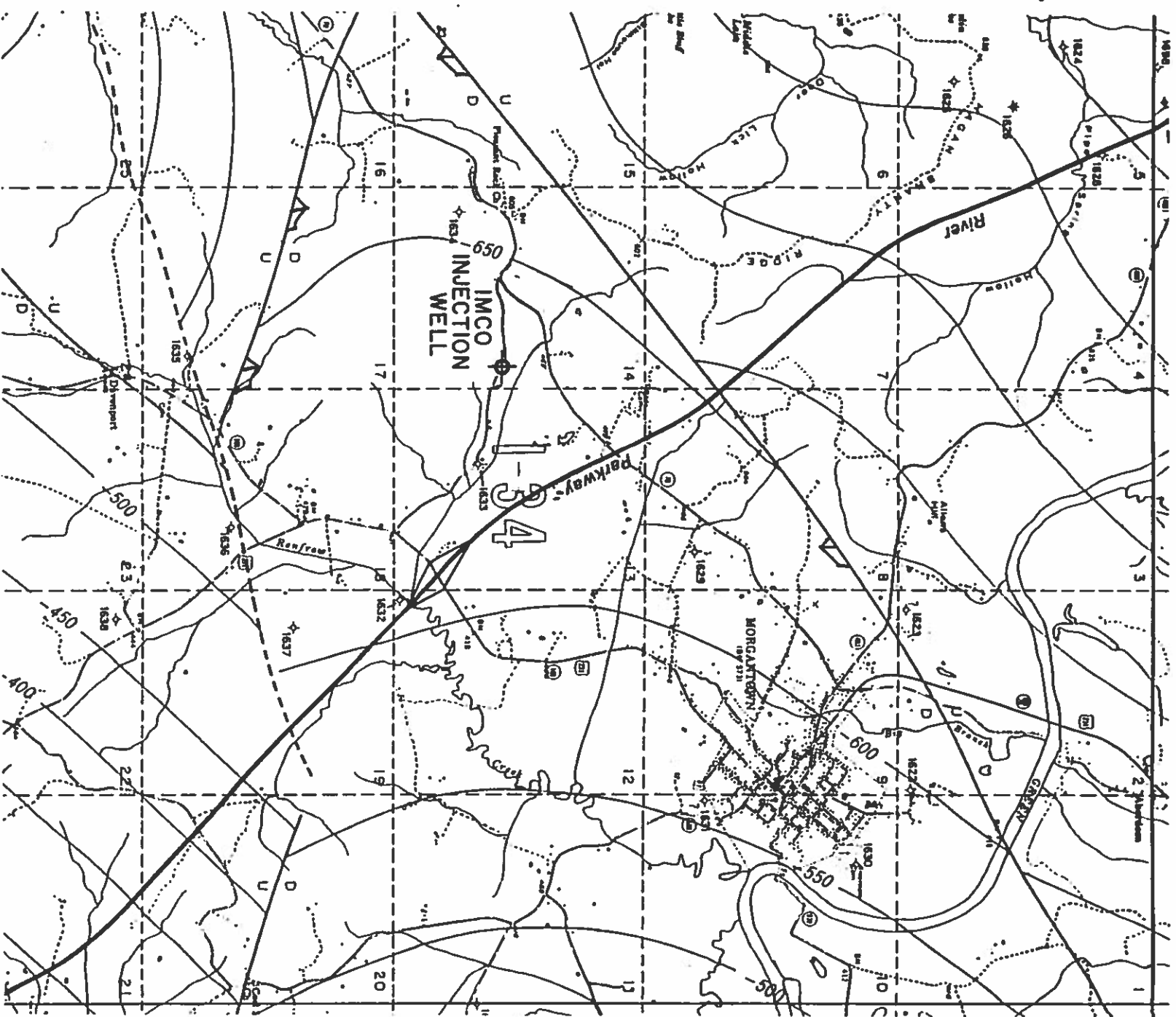
The bedrock at the site is horizontal or dips gently to the north. Faulting at the surface is observed about 3.5-4 miles south of the site. However, a fault inferred from subsurface information is located about 1.5 miles south of the site.

Figure F-3 shows structure on the base of the Mississippian Beech Creek Formation. The location of the injection well is on the faulted and westward-dipping nose structure.

Figure F-5 is an isopach and structure map of the New Albany Shale. The injection well is located on the southeastern flank of the Moorman syncline. Thus, the shallow nose structure does not extend down to deeper sections.

Figure F-5 shows regional north-south geologic cross-section of Butler County. The cross-section is about 3-4 miles west of the site.

Figures F-6 and 7 are cross-sections shoeing the local structure at the site. The locations of the cross-sections are shown on Figure F-8. All the cross-sections show clearly that the strata dip



(FROM SCHWALB, 1975)

STRUCTURE CONTOUR MAP ON BASE OF
BEECH CREEK FORMATION (MISSISSIPPIAN)

SCALE:	DATE	FIGURE F-3
1"=3450'		
APPROVED BY	DRAWN BY	DRAWING NO.

A. B. M. ENGINEERING AND ENVIRONMENTAL SERVICES, INC.
TULSA, OKLAHOMA

gently northward and westward toward Moortman Syncline axis. There is no structural complexity in the vicinity of the injection well.

U. S. ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT
AUTHORIZATION TO OPERATE A CLASS I INJECTION WELL
EPA UIC PERMIT NUMBER KY10429

Pursuant to the Underground Injection Control regulations of the U.S. Environmental Protection Agency codified at Title 40 of the Code of Federal Regulations, Parts 124, 144, 146 and 147,

IMCO Recycling, Inc.
609 Gardner Camp Road, Hwy 1468
Morgantown, Kentucky 42268

is hereby authorized to operate and plug and abandon the following Class I disposal injection well:

IMCO Injection Well #1
Butler County, Kentucky
Carter Coordinate 14-I-34
2340' FSL x 160' FEL

MAY 01 2001

DRAFT

This authorization is in accordance with the limitations, monitoring requirements and other conditions set forth herein. This permit consists of this cover sheet; Part I, 7 pages; and Part II, 13 pages.

All references to Title 40 of the Code of Federal Regulations are to regulations that are in effect on the date that this permit becomes effective.

This permit shall become effective on _____.

This permit and the authorization to inject shall remain in full force and effect for ten (10) years. This permit may be modified, revoked and reissued, terminated, or a minor modification made as provided at 40 C.F.R. §§144.39, 144.40 and 144.41. This permit shall be reviewed at least once every five years from the effective date.

DRAFT

Date	_____
	Beverly H. Banister, Director
	Water Management Division
	U.S. Environmental Protection Agency
	Region 4

PART I

WELL SPECIFIC CONDITIONS

SECTION A. CONSTRUCTION REQUIREMENTS

1. Casing and Cementing

The permittee shall maintain all casing and cement so as to prevent the movement of fluids into or between underground sources of drinking water. The casing and cement used in the construction of the well shall be designed for the life expectancy of the well.

2. Tubing and Packer

Injection may only take place through tubing with a packer set within the casing no higher than 75 feet above the base of the deepest casing. The tubing and packer shall be maintained in a manner which is compatible with the injection operation specified in Part I, Section B, and which prevents the movement of fluids into or between underground sources of drinking water.

3. Logs, Tests and Reports

The following tests and reports shall be prepared and submitted to EPA to demonstrate mechanical integrity:

- (a) A copy of all logs run in the well.
- (b) Cement tickets and invoice from the contracted cementing service company indicating cement volume, type, additives, and a job description summary.
- (c) A demonstration of the mechanical integrity of the well is required before injection can be authorized. The demonstration will consist of a pressure test on the tubing/casing annulus to at least 300 psig with less than 3% pressure loss in 30 minutes or an approved alternative MIT. The permittee shall contact EPA to arrange a date to conduct this test. A representative of EPA will be present to witness this test. If the well fails the test, the permittee shall cease injection operations until the problem is corrected and mechanical integrity can be demonstrated.
- (d) The permittee shall prepare a report, including procedures and results, of the logging and testing

programs. Each log shall include a written interpretation prepared by a knowledgeable log analyst. The report must be submitted in accordance with Part I, Section A, item 4, and shall be signed in accordance with Part II, Section E, item 11, of this permit.

4. Commencing Injection

The well authorized by this permit may not commence injection until:

- (a) Construction is complete, and the permittee has submitted to the Director, by certified mail with return receipt requested, a notice of completion using EPA Form 7520-10, and either:
 - (i) The Director has inspected or otherwise reviewed the new injection well and finds it is in compliance with the conditions of the permit; or
 - (ii) The permittee has not received, within thirteen (13) days of the date of the Director's receipt of the notice required above, notice from the Director of his or her intent to inspect or otherwise review the new injection well, in which case prior inspection or review is waived and the permittee may commence injection.
- (b) The permittee has demonstrated to EPA that the injection well has mechanical integrity, and has submitted the reports as specified in Part I, Section A, item 3.

SECTION B. OPERATING REQUIREMENTS

1. Injection Operation

Beginning on the date that Part I, Section A, item 4, is completed and lasting through the term of this permit, the permittee is authorized to inject only a mixture of saltwater leachate from the solid waste landfill collected in a retention pond on the plant site and fresh water runoff from the IMCO plant facilities in Morgantown, Kentucky. The injection well will be used only for disposal operations under the following conditions:

(a) Injection Zone

Injection shall be limited to the Knox Formation in the open hole interval between 4703 and 6450 feet below land surface.

(b) Injection Pressure Limitation

(i) The maximum allowable wellhead injection pressure for the IMCO Injection Well #1 will be 2700 psig. Upon approval by the Director, the permittee may inject at the maximum pressure attained during any step-rate test conducted on the injection well authorized by this permit. Step-rate injectivity test procedures must be approved by the Director prior to conducting the test and the test may be witnessed by EPA or an agent designated by EPA.

(ii) Injection at a pressure which initiates or propagates fractures in the injection zone, the confining zone, or causes the movement of injection or formation fluids into an underground source of drinking water is prohibited.

(iii) Injection between the outermost casing protecting underground sources of drinking water and the well bore is prohibited.

2. Annulus Operation

The annulus between the tubing and the long-string casing shall be filled with brine or other fluid as approved by the Director. The annulus pressure shall be maintained at 10 psig.

The annulus shall be monitored with a gauge designed to indicate both a vacuum (below atmospheric) and positive pressure (above atmospheric). The permittee shall comply with Part I, Section B, item 3, when a change in the annulus pressure of 13 psig occurs. The permittee shall provide an explanation to the Director for the change in pressure and measures that will be taken to restore annulus pressure to achieve compliance with this Section. If the cause of annulus pressure change is not corrected within 48 hours, the permittee shall cease injection unless such order to cease operation is waived by the Director.

3. Loss of Mechanical Integrity During Operation

The permittee shall cease injection if a loss of mechanical

integrity as defined at 40 C.F.R. §146.8 becomes evident during operation. Operation shall not be resumed until the permittee has complied with the provisions of Part II, Section G, of this permit regarding mechanical integrity demonstration and testing.

The permittee shall notify the Director of the loss of mechanical integrity in accordance with the reporting procedures in Part II, Section E, item 12(d). The Director may allow the owner or operator of the well to continue or resume injection if the owner or operator makes a satisfactory demonstration under 40 C. F. R. §144.51(g) (3) that there is no movement of fluid into or between the USDWS.

SECTION C. MONITORING REQUIREMENTS

1. Sampling and Analysis Methods

Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. Grab samples shall be used for the laboratory analysis of the physical and chemical characteristics as specified in Part I, Section C, item 3(a). Test methods and procedures shall be as specified at 40 C.F.R. §136.3 or 40 C.F.R. Part 261, Appendix III. When the analytical method for a particular parameter is not specified at either 40 C.F.R. §136.3 or 40 C.F.R. Part 261, Appendix III, the permittee must obtain the Director's approval of the method used. The permittee shall identify the types of tests and methods used to generate all monitoring data. Reports to be generated from monitoring data are specified in Part I, Section D.

2. Injection Operation Monitoring

The permittee shall monitor the operation of the injection well as follows:

<u>Parameter</u>	<u>Monitoring Frequency</u>
Injection Pressure (psig) at Wellhead	Continuously
Annulus Pressure (psig) at Wellhead	Continuously
Flow Rate (barrels/day) of Injected Fluid	Continuously

Cumulative Volume (barrels) of Injected Fluid	Continuously
Pressure Buildup in the injection Zone	Annually

3. Injection Fluid Analysis

The permittee shall conduct an injection fluid analysis at least once every three (3) months and whenever changes are made to the injection fluid. Analyses shall be made beginning within three (3) months from the effective date of this permit, or three (3) months from the most recent analysis, whichever is later. For wells that resume injection after having been shut in, the permittee will have thirty (30) days from the date injection resumes for the submission of the injection fluid analysis. An analysis must include:

- (a) pH, total dissolved solids, total suspended solids, specific gravity, barium, calcium, total iron, magnesium, sodium, bicarbonate, carbonate, chloride, sulfate, carbon dioxide, dissolved oxygen, aluminum, lead, cadmium and hydrogen sulfide.
- (b) A list of all chemicals and their composition used for any well stimulation and fracturing during that sampling period; and a list of any additives used and their chemical composition, including any inhibitors used to prevent scaling, corrosion, or bacterial growth. These lists should indicate the brand name of the product and the manufacturer.
- (c) Other physical and chemical characteristics of the injection fluid as required by the Director.

SECTION D. REPORTING REQUIREMENTS

1. Reports on Well Tests and Workovers

Within thirty (30) days after the completion of the activity, the permittee shall report to the Director the results of the following:

- (a) Mechanical integrity tests, other than those specified in Part I, Section A, item 3; and
- (b) Any well workover, logging or other test data, other

than those specified in Part I, Section A, item 3,
revealing downhole conditions.

2. Reporting of Monitoring Results

The permittee shall submit monitoring results on EPA Form 7520-14, whether injecting fluids or not, to the Director summarizing the results of the monitoring as specified in Part I, Section C of this permit. The first monitoring report shall be made within three (3) months from the effective date of this permit, or three (3) months from the most recent analysis, whichever is later. Subsequently, the monitoring report shall cover the period from January 1 through March 31, April 1 through June 30, July 1 through September 30, and October 1 through December 31. All reports submitted to the Director shall indicate the status of the injection well, i.e., active, shut-in, or plugged and shall be submitted with 30 days from the close of the reporting period.

Copies of the monitoring results required by Part I and all other reports required by Part II shall be submitted to the Director at the following address:

U. S. Environmental Protection Agency
Region 4, Water Management Division
Ground Water/Drinking Water Branch
Ground Water & UIC Section
61 Forsyth Street, SW
Atlanta, Georgia 30303-8960

3. Reporting of New Wells Drilled Within the Area of Review (AOR)

Within ten (10) days after spud date, the permittee shall report to the Director by certified mail, return receipt requested, the construction plans for any new well that will penetrate the confining zone or injection zone that is listed in the public records or otherwise known to the permittee to be within the area of review.

If the construction of the new well will not protect USDWS from contamination, the Director may terminate the permit under 40 C.F.R. §144.40(a)(3), if he or she determines that continued injection may endanger human health or the environment.

SECTION E. PLUGGING AND ABANDONMENT PLAN

Plugging and abandonment (P&A) of the permitted injection well shall be in accordance with Part II, Section F, of this permit and 40 C.F.R. §146.10.

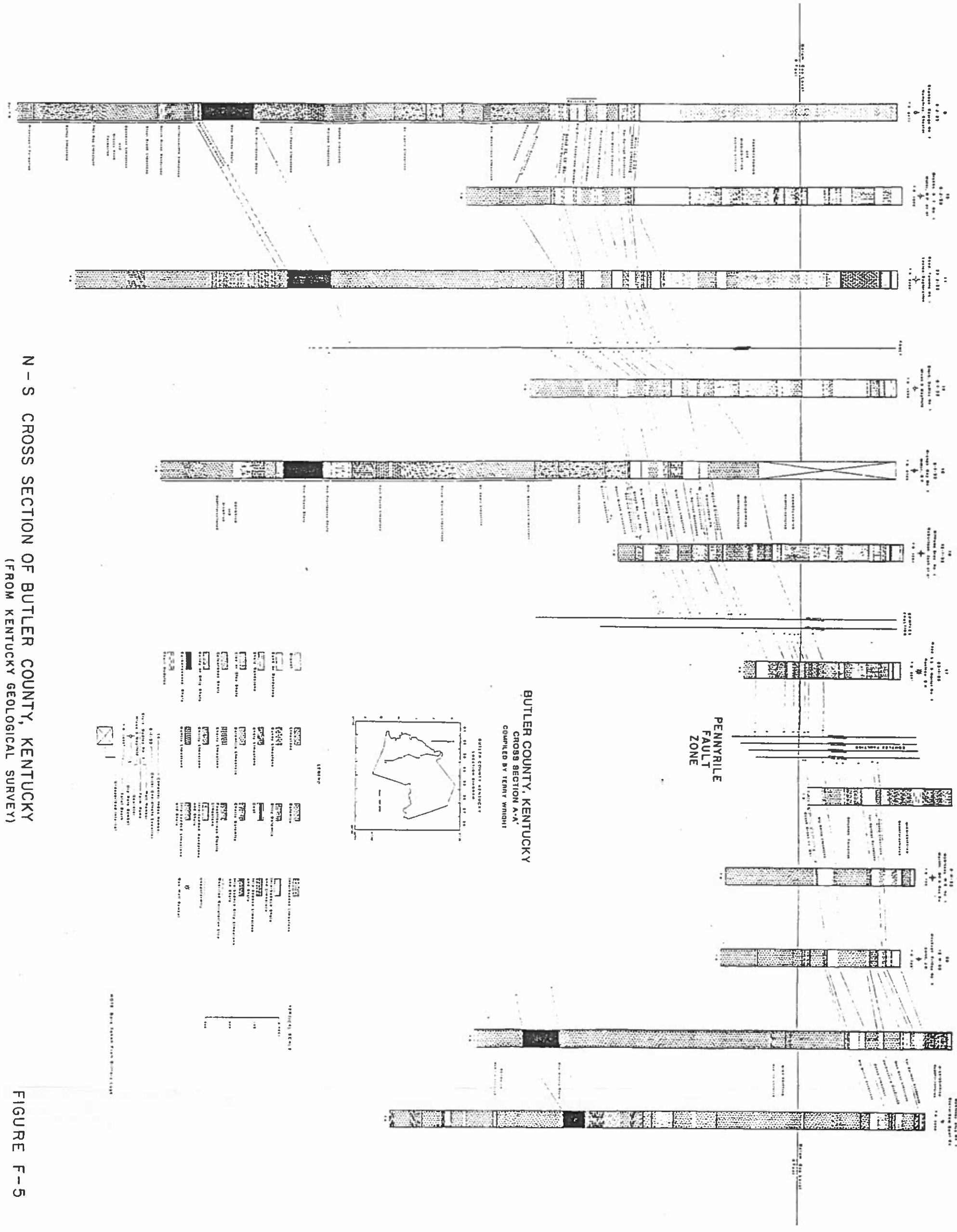
During the operating life of the permitted well, this injection facility may be screened for technologically enhanced naturally occurring radioactive material (NORM) by EPA or another party. If the permittee is notified by a party other than EPA, or becomes aware at any time that elevated levels of NORM have been detected at this injection facility, the permittee must notify EPA in writing of that fact no later than 45 days prior to the permittee's intent to P&A the well. EPA may require the permittee to revise the P&A plan to ensure the safe disposal and proper management of elevated levels of NORM waste.

The plugging of this injection well shall be performed in the manner described Attachment Q of the permit application.

A
NORTH

MOORMAN SYNCLINE

A
SOUTH

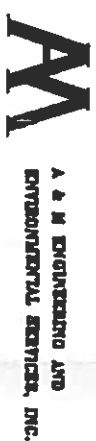


N-S CROSS SECTION OF BUTLER COUNTY, KENTUCKY
(FROM KENTUCKY GEOLOGICAL SURVEY)

FIGURE F-5

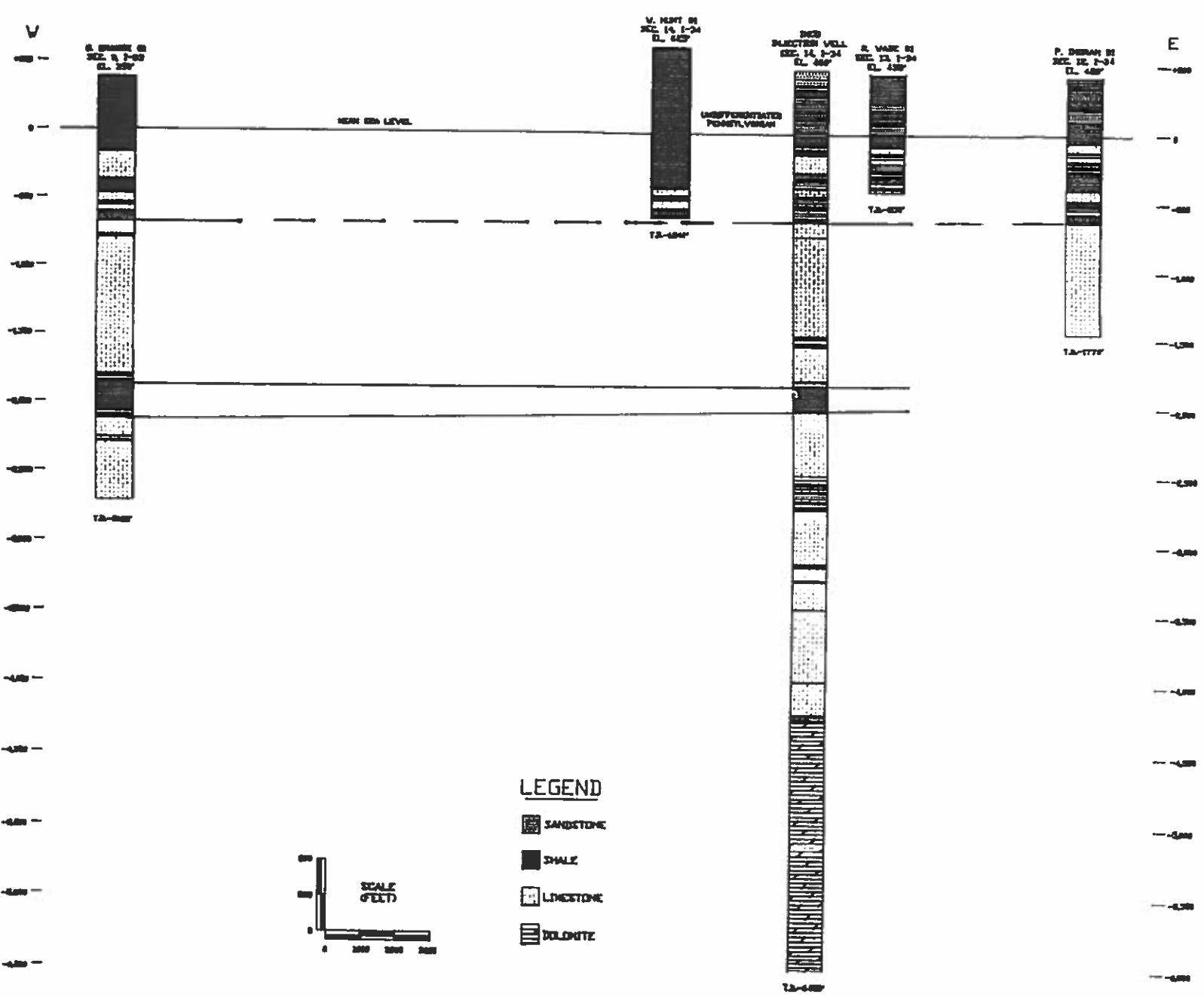
GENERAL NOTES

NO.	DESCRIPTION	DT	DATE	BY	REVISIONS	DT	DATE	BY
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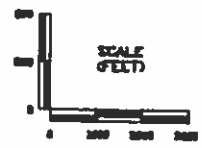
A & M ENGINEERING AND
ENVIRONMENTAL SERVICES, INC.

W-E Geologic Cross Section
Injection Well
Morgantown, Kentucky
Figure F-7



LEGEND

- SANDSTONE
- SHALE
- LIMESTONE
- DOLomite



ATTACHMENT G

NOT APPLICABLE

ATTACHMENT H

OPERATING DATA

Volume and Flow Rate of Injection Fluid:

The water to be disposed in the injection well will be runoff water from the plant site and salt water leachate from the non-hazardous solid waste landfill. ✓

Aleris' property in Morgantown, Kentucky is about 453 acres, but the facilities including the landfill which may produce chloride contaminated leachate is only 35 acres. The average yearly precipitation in the area is about 3.3 feet. For purposes of calculation of maximum value, a runoff factor of 1 is used.

Thus, total yearly amount of runoff water from the 35 acres will be: $Q = CAP$

$$Q = 1 \times 35 \times 3.3 = 115.5 \text{ acre feet}$$

Converting acre feet to gallons:

$$115.5 \times 325,836 = 37,634,058 \text{ gallons/year}$$

Considering 80% efficient injection time throughout the year, it will give:

$$365 \times 0.8 = 292$$

or

$$292 \times 1440 = 420,480 \text{ minutes of injection time}$$

Then the needed average injection flow rate to handle the non-hazardous runoff water and leachate will be:

$$37,634,058 : 420,480 = 89.5 \text{ gallons/minute}$$

This value considers zero annual evaporation of water. However, taking into consideration the wet years (above average precipitation), the maximum injection flow rate would be 120 gallons per minute. The injection rate of 120 gallons per minute would handle a yearly precipitation of 4.4 feet.

In summary:

Average flow rate = 90 gal/min = 129,600 gal/day = 3,086 bbl/day

Maximum flow rate = 120 gal/min = 172,800 gal/day = 4,114 bbl/day

Injection Pressure:

An acid job was conducted on the injection zone (Knox dolomite) during construction of the injection well. During the acid job, the acid injection pressure was about 3000 psi at wellhead. However, there was no fracturing in the formation. After this acid job, an injection test was conducted. The results of both acid job and injection test were submitted to U.S. EPA Region IV on January 23, 1992 to determine the maximum allowable injection pressure and to modify the original permit.

U.S. EPA Region IV responded on February 5, 1992 allowing to operate the injection well with 2,700 psi wellhead pressure, based on the submitted data.

Average Injection Pressure

The average injection pressure could be determined by using the formula of pressure rise in the injection zone. The same formula also gives approximate lifetime of the well. The formula is:

$$\Delta P = \frac{162.6 \times Q \times u}{K \times b} \times \left(\log \frac{K \times t}{\phi \times \mu \times c \times r^2} \right)$$

where:

Q = flow rate in bbl/d (90 gal/min = 3085.7)

u = viscosity of fluid, 0.8 centipoise

K = average permeability of injection zone (8 millidarcies)

b = effective thickness of injection zone, 850 feet

C = reservoir compressibility, 7.5×10^{-6} psi

r = well Radius of injection zone, 0.26 feet
 ϕ = Average porosity of injection zone, 8% = 0.08
t = time of injection in hours

Solving the formula for the above values, the following results are obtained:

Cumulative Pressure Rise	
<u>Time (t), hours</u>	<u>in injection zone ΔP</u>
4,380 (0.5 year)	519.43 psi
8,760 (1 year)	537.14 psi
43,800 (5 years)	578.64 psi
87,600 (10 years)	596.17 psi
175,200 (20 years)	613.88 psi
350,400 (40 years)	631.58 psi

The above calculation results indicate that the average injection pressure will rise about 600 psi and the tested injection pressure for 90 gpm was about 1200 psi. That will put the injection pressure at 1800 psi after 40 years' injection. This injection pressure is below the allowed 2700 psi injection pressure.

Annulus Fluid

The annulus is filled with water containing corrosion inhibitor (Halliburton Anhib, see Exhibit H-1). The annulus fluid is pressurized to over 10 psi but less than 50 psi and monitored continuously. The annulus monitoring system is shown on Figure H-1.

between 10-50 psi

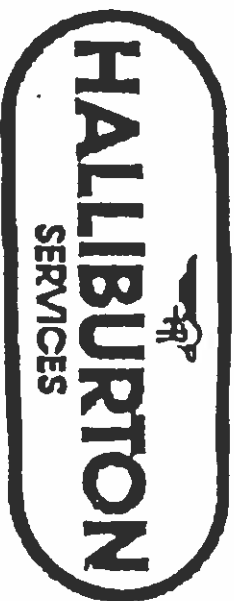
Injection Fluids:

The only fluids to be injected into the injection well are the chloride contaminated runoff water from the plant site and leachate from the solid waste landfill which are collected in adjacent pond.

Chemical analysis reports of the solid waste (baghouse dust and salt cake) and leachate are included in Appendix B. The solid waste has high chloride and sodium concentrations. Besides these two non-hazardous contaminants, there are no other potential contaminants. Leachate analysis shows presence of same parameters (sodium and chloride).

EXHIBIT H-1

**ANNULUS FLUID CORROSION INHIBITOR
DATA**



ANHIB

Packer Fluid Corrosion Inhibitor

Halliburton Services ANHIB corrosion inhibitor is designed for use in aqueous fluids for placement in the annular space between tubing and casing or behind casing. As a multi-component system, ANHIB inhibitor can be used in place of high pH chromate used with bactericide. It is effective against oxygen, hydrogen sulfide and carbon dioxide corrosion.

Chemical Properties

Oxygen Scavenger

Requires a minimum concentration of 500 ppm (1/2 gal/1000 gal) to completely remove all oxygen from air saturated water. It is somewhat slower to pick up oxygen than most scavengers and is therefore less prone to lost while mixing, however careful mixing procedures should be followed.

Bactericide

Excellent bactericide for sulfate reducing bacteria at 40 ppm, however, for quick kill 500 ppm is recommended.

Corrosion Inhibition

Reduces oxygen corrosion by removing the oxygen. Minimizes corrosion by CO₂ and H₂S. (See Tables I and II)

Surface Tension

Reduces surface tension of sea water containing 1,000 ppm ANHIB inhibitor to 40.5 dyne/cm.

Compatibility

ANHIB is compatible with most Halliburton crosslinked gels which may be used as light weight annular, packer or completion fluids as well as Halliburton's Hydrocote fluid.

Stability

ANHIB is stable up to at least 300°F in brine solutions. (See Table III)

Benefits

- No pH adjustment required
- Reduced effect with hydrogen sulfide contamination
- Compatible with most brine or salt solutions
- Slow oxygen pickup
- Compatible with gels and crosslinked gels

Mixing Procedure

ANHIB corrosion inhibitor is readily soluble in most brines and easily soluble in a 2 percent KCl solution. This will help reduce mixing problems; however, it is an effective oxygen scavenger and will pick up oxygen from the air. It should be added with a minimum of agitation and preferably introduced below fluid level to minimize contact with air. It can be metered into the fluid as it is being pumped into the well.

Concentrations

ANHIB inhibitor can be used at a concentration as low as 500 ppm, (1/2 gal/1,000 gal); however, the standard recommendation is 5 gallons per 100 bbls, (1,190 ppm). At temperatures above 200°F the use concentration should be 10 gal per 100 bbls, (2,380 ppm). (ANHIB contains a red dye and can be seen in tap water at a concentration of 200 ppm)

Special Application

Gelled fluids are sometimes placed behind the intermediate string of pipe rather than cement to allow pipe recovery at some later date. The gel will remain behind the long string to as long as the well is produced and should be properly inhibited to protect the pipe from corrosion. Most corrosion inhibitors are not compatible with the crosslinked gel recommended for this application. ANHIB was specifically designed to be compatible with these crosslinked gels used as annular fluids behind casing.

ANHIB inhibitor is a red colored liquid with the following physical properties:

Flash Point	81°F TOC 67°F TCC
Pour Point	-20°F
Specific Gravity @60°F	1.07
Density @60°F	8.9 lbs/gal
Odor	Pungent, alcohol
pH 10% solution in distilled water	8.4
Viscosity	64 cps @60°F

Table I
CO₂ Corrosion Tests

Type: Pressure bottle
Fluid: Tap Water*
Temperature: 72°F
Acid Gas: CO₂ @ 15 psig
Time: 7 days
Coupon: AISI 1020 carbon steel

ANHIB Concentration ppm	Corrosion Rate MPY
0 (blank)	11.3
5	0.8

Percent Protection
0
93

* Contains a trace of oxygen when saturated with CO₂

Table II
Dynamic Corrosion Tests

Type: Wheel Test
Corrosive Fluid: 5% NaCl saturated with H₂S
Time: 1 day
Temperature: 100°F

ANHIB Concentration	Percent Protection
20 ppm (1/50 gal/1000 gal)	93
50 ppm (1/20 gal/1000 gal)	93

Table III
High Temperature Corrosion Test

Type: Pressure bottle
Corrodent: Oxygen saturated brine*
pH: 9 to 9.5
Temperature: 300°F
Time: 5 days

ANHIB Concentration	Percent Protection
2000 ppm (2 gal/1000 gal)	72
5000 ppm (10 gal/1000 gal)	76

* Brine contains 2% KCl adjusted to 10.2 lbs/gal with CaCl₂. It was air saturated at room temperature then heated in a closed system.

Halburton warrants only use of the product, supplies and materials consistently against defective workmanship and the fitness for service of the product. It is not warranted that the product will perform in any particular manner, nor is it warranted that the product will be free from all defects. The product is sold as is, without warranty, express or implied, of merchantability or fitness for any particular purpose. The product is sold as is, without warranty, express or implied, of merchantability or fitness for any particular purpose. The product is sold as is, without warranty, express or implied, of merchantability or fitness for any particular purpose.

For reason of economy or otherwise, cutting out of the use or use of any product, supplies or materials is expressly limited to the discretion of Halburton. Halburton's obligation to the customer of credit for the cost of such work, in no event shall Halburton be liable for indirect, incidental, special or consequential damages.



HALBURTON

3XH

Effect of H₂S on Corrosion Inhibition

Test Temperature		200° F (93° C)				
Test Time		6 Hours				
Metal Type		N-80				
Pressure		Atmospheric				
Corrosion		15% HCl Saturated with H ₂ S				
		Corrosion Rate				
Inhibitor Concn.	% Acid Add.	HA-50 lb/ft ²	HA-75 kg/m ²	HA-85 lb/ft ²	HA-85 kg/m ²	
0.15*	—	0.011	0.054	—	0.006	0.029
0.15*	0.4%SCA-130	0.007	0.034	—	0.003	0.015
0.3	—	0.070	0.342	0.052	0.254	—
0.3	0.4%SCA-130	0.025	0.1221	0.011	0.054	—
0.5	—	0.038	0.185	0.011	0.054	—
0.5	0.4%SCA-130	0.011	0.054	0.008	0.039	—

*Tests Run at 150° F (65° C) on P105 Coupons.

NOTE: SCA-130 is not compatible with Super Acidfrac and should not be used in that system. HAI-50 and HAI-55 are also incompatible with Super Acidfrac.

ANHIB
PACKER FLUID CORROSION INHIBITOR

Introduction

ANHIB is a corrosion inhibitor which is designed for use in aqueous fluids for placement in the annular space between tubing and casing or behind casing.

ANHIB is a multi component system in a single drum which can be used in place of sodium chromate. It is effective against oxygen, hydrogen sulfide and carbon dioxide corrosion. No pH adjustment is required with this inhibitor; therefore, it should be easier to use than sodium chromate. In addition, ANHIB is an organic corrosion inhibitor which will not be as adversely affected by hydrogen sulfide as the chromate system if contamination occurs. This material is also an effective bactericide for sulfate reducing bacteria when used in the recommended concentration range. The normal recommended dosage for this inhibitor is 5 gallons per 100:

39
bbls. (120 liters per 100m³) (approximately 1200 ppm) or 1 gallon per 1000 gallon (1 liter per 1000 l).

Materials Used in Process

ANHIB (Part No. 70.15341) is red colored liquid with following physical properties:

Flash Point.....	81° F (27° C) T.O.C./67° F (19° C) T.C.C.
Pour Point.....	—20° F (-29° C)
Specific Gravity @ 60° F (15.6° C).....	1.07
Density @ 60° F (15.6° C).....	8.9 lb/gal (1.06 kg/l)
Color.....	Red
Odor.....	Pungent, alcoholic
pH 10% solution in distilled water.....	8.4
Viscosity.....	64 cps @ 60° F (15.6° C)
Stability.....	Greater than 6 months

but should be used as soon as possible.

NOTE: An open can will degrade eventually so it is recommended that you use all of the 5 gallon can. Carefully replace the bung in a 55 gallon drum. The bung should be tight to prevent additional air from entering the drum.

Mixing Procedure

ANHIB is readily soluble in most brines so should present no mixing problems; however, it is an effective oxygen scavenger and will pick up oxygen from the air. It should be added with a minimum of agitation. Do not use air agitation. Hoses should be introduced below fluid level to minimize beaing in additional air. Waiting time before pumping should also be kept to a minimum.

You may want to meter the material into the packer fluid at the pump suction as a concentrate. The hydrazine pump should be satisfactory for this purpose.

Use Concentration

ANHIB can be used at a concentration as low as 500 ppm (1/2 gal/1000 gallons) (1/4 l /1000 l); however, the standard recommendation is 5 gallons in 100 bbls (120 liters in 100m³). At temperatures above about 220° F (93° C) the use concentration should be 10 gal/100 bbls (240 l/100m³).

ATTACHMENT I

FORMATION TESTING PROGRAM

Lithology Log:

During drilling, drill cuttings were sampled at 10-foot intervals from the surface to total depth. These samples were examined by a geologist. A lithologic description and strip log are enclosed in Appendix D. The collected samples are delivered to Kentucky Geological Survey.

Pressure

During well construction, DST's (Drill Stem Tests) were conducted to determine formation pressure and pressure gradient in the well. The first DST was run at 4750-5250 feet depth with a pressure of 2089 psi and pressure gradient of 0.435 psi/ft. The second DST was at 5250-5872 feet depth with a pressure of 2341 psi and pressure gradient of 0.422 psi/ft. The third DST was at 5900-6450 feet with a pressure of 2650 psi and pressure gradient of 0.445 psi/ft. The data related to DST's are included in Appendix E.

Temperature

A temperature log was run and it is included in Appendix D. The bottom hole (6450 feet) temperature is 112° F. The geothermal gradient is about 0.7 to 1.0 F°/100 feet.

Formation (Injection Zone) Fluid:

During Drill Stem Tests (DST's), formation fluid was recovered and was sampled. These fluid samples were analyzed for the required parameters. The analytical reports of these samples are in Appendix E.

The formation fluid shows stratification, as depth increases the total dissolved solids increase from 61,260 ppm to 94,040 ppm and specific gravity from 1.036 to 1.06.

The formation fluid and injectate were mixed at room temperature and at formation temperature (112° F) and there were no reactions or precipitation observed.

Swabbing

After logging and drilling cement ^{plugs} were completed at total depth, the drilling mud was evacuated from the well and the well was cleaned with water. After cleaning, the well was swabbed. Black, sulphur formation fluid was recovered; the same as the fluid recovered during drill stem tests.

Swabbing was also conducted after perforating the formation to clean the well.

Injection Survey

The first injection test was conducted on December 30-31, 1991, in the well after the first clean-up to determine the hydraulic conductivity of the injection zone and its acceptability of the fluid. The results are shown in Appendix F. The well was accepting fluid at a rate of 10-14 gpm with 1000 psi wellhead pressure.

The second injection test was conducted on January 17,192 after perforating and acidizing the injection zone. The injection test was step - rate type and the results are included in Appendix F. The injection rates and pressures were 42 gpm with 330 psi; 58 gpm with 522 psi; 84 gpm with 890 psi; 105 gpm with 1254 psi; and 150 gpm with 1984 psi. The summary data of this test is shown on Table I-1 and Figure I-1.

Injection Zone Characteristics:

The injection zone is the Knox dolomite at depth of 4705-6450 feet. The average porosity is about 10 percent. The effective reservoir thickness is approximately 600-850 feet. The porosity types are intercrystalline, fracture, and vugs.

The permeability was calculated in a range of 1.6 to 50 md from the drill stem test. However, permeability calculation from the injection test data of January 17, 1992 (after acidizing) shows it to be 6-10 md.

Transmissivity values were calculated from drill stem tests to be 229.5 md feet/cp for 4750-5250 feet, 6764.16 md feet/cp for 5250-5872 feet and 10731.6 md feet/cp for 5900-6450 feet depth.

Transmissivity was calculated to be 2634.12 md ft/cp from the injection test of January 19, 1992 for all injection zones (4700-6450 feet).

Attempted to obtain core samples by sidewall coring, but after three samples were obtained at depths of 3324, 3809, and 3833 feet, the tool malfunctioned and could not complete coring.

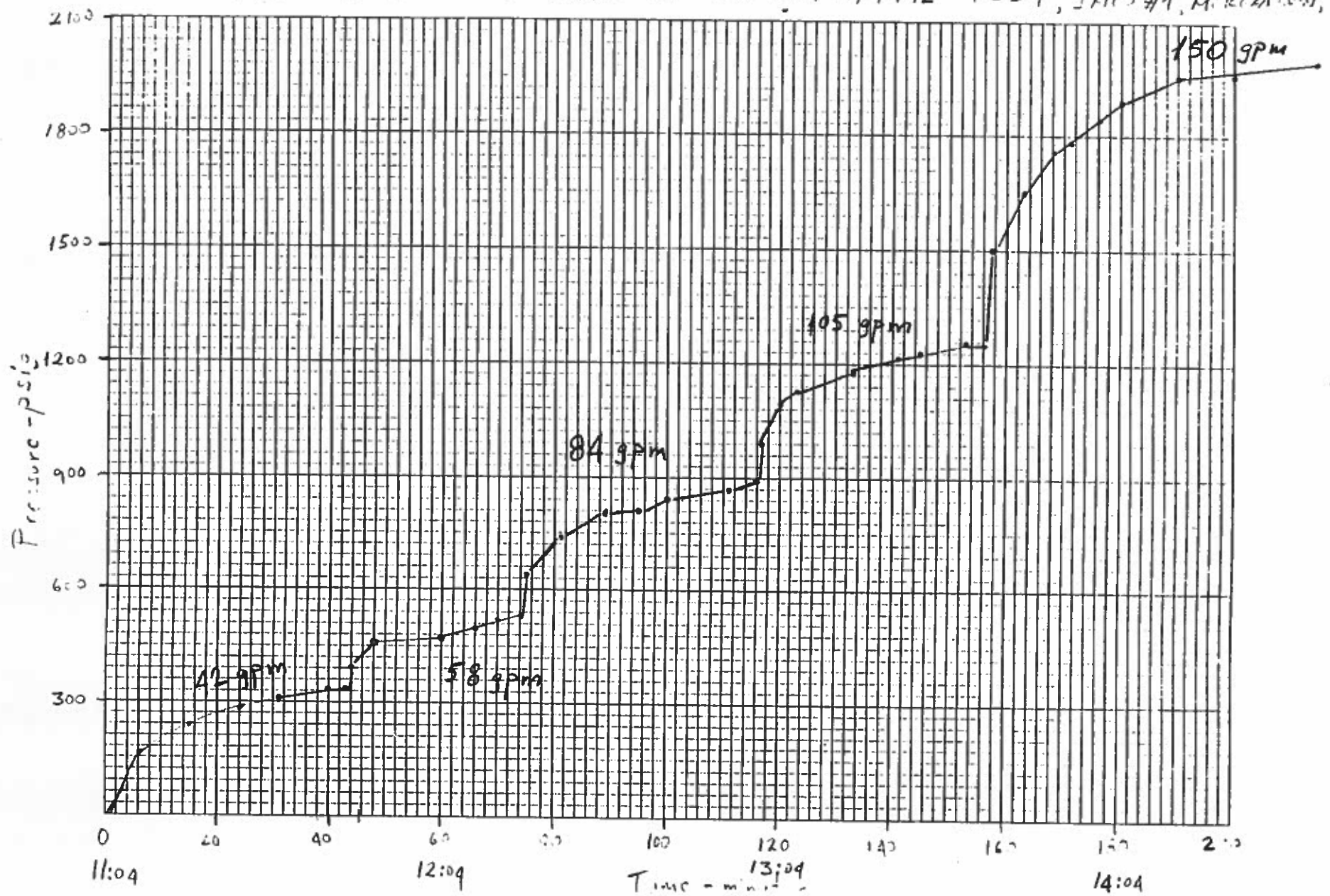
TABLE I-1
INJECTION RATES, PRESSURES AND INJECTIVITIES RECORDED
DURING THE JANUARY 17, 1992 INJECTION TEST

TIME (Hour)	INJECTION RATE (gpm)	WELLHEAD INJECTION PRESSURE (psig)	INJECTIVITY (gpm/psi)	
11:04 start				
11:35	42	304	0.138	
11:40	42	320	0.131	
11:45	42	331	0.126	
11:47	55	389		Rate increase
11:57	55	440		
12:00	59	458		
12:05	59	466		
12:10	59	504		
12:15	59	515	0.114	
12:18	59	522	0.113	
12:19	84	632		Rate increase
12:25	84	737		
12:40	84	821		
12:45	84	845		
12:50	84	867		
12:55	84	880	0.095	
12:59	84	888	0.094	
13:00	106	985		Rate increase

TIME (Hour)	INJECTION RATE (gpm)	WELLHEAD INJECTION PRESSURE (psig)	INJECTIVITY (gpm/psi)	
13:06	106	1124		
13:10	106	1142		
13:15	106	1153		
13:20	106	1203		
13:25	106	1227		
13:30	106	1233	0.086	
13:35	106	1250	0.084	
13:40	106	1254	0.084	
13:40:1	147	1500		Rate increase
13:45	147	1645		
13:50	147	1735		
13:55	147	1787		
14:00	147	1839		
14:07	147	1887		
14:10	147	1900		
14:15	147	1933		
14:21	147	1938		
14:25	147	1957		
14:30	147	1969		
14:35	147	1978	0.074	
14:40	147	1984	0.074	
14:41	0	1540	Instant shut-in pressure	
14:45	0	1004	5 minutes shut- in pressure	
14:50	0	760	10 minutes shut-in pressure	

Figure I-1

PRESSURE-INJECTION RATE OF JANUARY 17, 1992 TEST, INCO #1, MORGANTHAU, KY.



ATTACHMENT J

STIMULATION PROGRAM

After the first injection test, it was recognized that the injection zone did not have the capacity needed. Thus the decision was made to perforate the zones with good potential and follow with an acid job.

The perforating job was conducted during January 5-10, 1992. The following zones were perforated with 100 gram shots, one per foot: 4894'-4904', 4996'-5024', 5148'-72', 5366'-70', 5398'-5406', 5464'-72', 5534'-52', 5570'-88', 5612'-32', 5658'-70', 5680'-90', 5712'-24', 5732'-38', 5806'-10', 5842'-66', 5910'-16', 5988'-94', 6026'-34', 6074'-84', 6128'-38', 6182'-88', 6230'-52', 6315'-30', 6358'-74', 6402'-04', 6420', 6432'-38'.

After perforating job was completed, the well was cleaned and swabbed. Then on January 15, 1992, the injection zone (4705-6450 feet depth) was acidized with 15,000 gallons 28% hydrochloric acid in five stages. Salt was used as a diverter. Acid job records are included in Appendix F. The acid job resulted in drastic improvement of the injection zone, from 14 gpm with 1000 psig wellhead pressure to 84 gpm with 888 psig well head pressure.

ATTACHMENT K

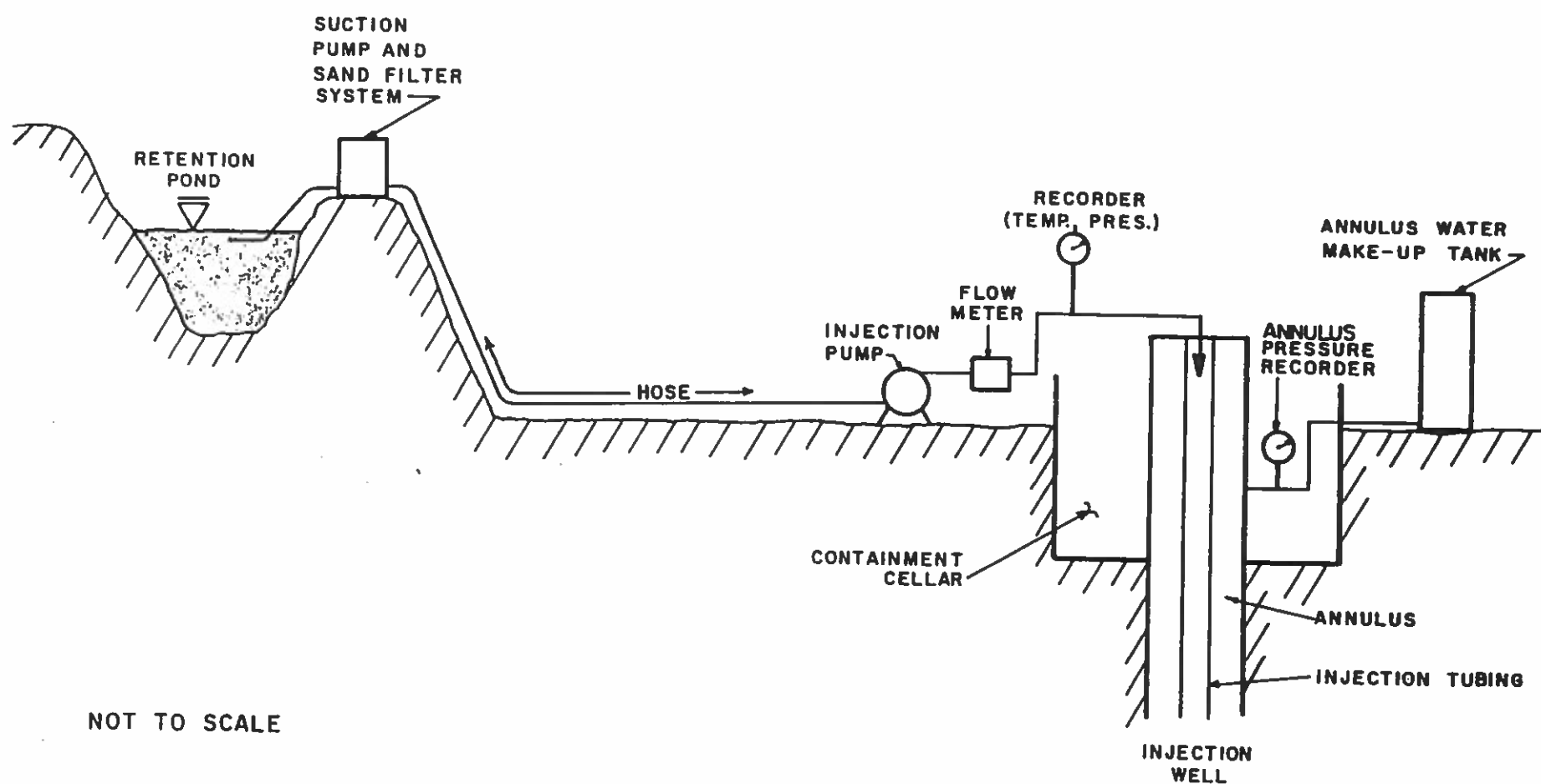
INJECTION PROCEDURES

The injection procedure includes suction of the fluid from the retention pond and pumping it into the injection well. Figure K-1 shows schematically the surface injection system.

The suction assembly consists of: 1) screen, to prevent suspended solids; 2) hoses; 3) check valve; 4) hoses; and 5) pump. The detailed drawing of this section is shown on Figure M-2.

The water sucked from the retention pond goes through pressurized sand filters to further eliminate suspended solids in the fluid. The fluid is transported by 3" plastic hose from the sand filters to the injection pump next to the injection well. The detail of the filter system is shown on Figure M-3.

The injection pump is piston pump (positive displacement pump). The pump has a capacity up to 120 gallons per minute.



A. & M. ENGINEERING AND
ENVIRONMENTAL SERVICES, INC.
TULSA, OKLAHOMA

SCHEMATIC SURFACE DESIGN DRAWING OF THE
INJECTION WELL

FIGURE NO. K-1

ATTACHMENT L

CONSTRUCTION PROCEDURES

The injection well was drilled during August - December 1991, to a depth of 6,450 feet by a rotary drilling rig. During drilling, water-base mud provided by M-1 Drilling Fluids Company was used.

Drilling commenced on August 11, 1991. First a 17 1/2" hole was drilled to 42 feet depth and set up 13 3/8" conductor pipe with 100 sacks of cement.

Drilling was continued with 12 1/4" diameter bit to 471 feet (driller depth). Logging (SP and resistivity) was conducted before setting 9 5/8" casing at depth of 471 feet.

The well was drilled with 8 3/4" diameter bit to 2526 (driller depth) feet depth and 7 7/8" bit to 4,000 feet depth. After logging, 7" K-55 long string casing was set in at 2542 feet depth. The Devonian-Silurian and part of the Ordovician carbonate sections were evaluated for injection and due to low potential and some problems with the fracturing program, the decision was made to drill deeper into the Knox Dolomite.

Drilling was resumed after new permits were obtained from the U.S. EPA and Kentucky Oil and Gas Division. The well was bottomed to 6450 (driller depth) feet into the Knox Dolomite. The size of the bit was 6 1/8".

The copies of the drilling records of the injection well are included in Appendix G and Figure L-1 shows the subsurface construction details of the injection well.

Casting and Tubing Program:

Conductor Pipe: 13 3/8" conductor pipe was set at 42 feet depth with 100 sacks of cement.

Surface Casing

9 5/8" OD, K-55 seamless, 36.0 lb/ft STC (Short Threaded Couplings).

Collapse Resistance: 2020 psi

Internal Yield: 3520 psi

Body Yield Strength: 564,000 lbs.

Joint Strength: 423,000 lbs.

475.70 feet of new 9 5/8" casing was set in the well with 450 sacks of cement. The lowest USDW is at a depth of 260 feet and the surface casing (9 5/8") is set about 200 feet lower.

Long String

7" OD, K-55 seamless, 23 lb/ft, long threaded couplings.

Collapse Resistance: 2370 psi

Internal Yield Pressure: 4360 psi

Body Yield Strength: 366,000 lbs.

Joint (Coupling) Strength: 341,000 lbs.

7 lowest joints of 7" casing were sandblasted for better cement bonding. Long string (7") casing was set at 2542 feet depth with 450 sacks of cement. The cement was circulated through formation packer pack-off shoe.

The purchase ticket for 9 5/8" surface casing and 7" casing are shown as Exhibit L-1. These casings were electronically inspected before delivery to the site.

Liner String

4 1/2", K-55 seamless, 10.5 lb/ft, short threaded couplings.

Collapse Resistance: 4010 psi

Internal Yield Pressure: 4790 psi

Body Yield Strength: 165,000 lbs.

Joint (Coupling) Strength: 146,000 lbs.

The 4 1/2" casing was hung with 7 foot long Baker Hyflo "III" Liner Hanger. Top of hanger is at 2300 feet depth. The 4 1/2" casing was set at 4703 feet depth with 650 sacks of cement. The cement was circulated through formation packer pack-off shoe.

The tally sheet of 4 1/2" casing is shown as Exhibit L-2. The 4 1/2" casing was inspected electronically before delivery to the site. Baker Hyflo "III" Liner Hanger information is presented as Exhibit L-3.

Tubing (Injection)

Two types of injection tubing form the injection tubing strings: 1) 3 1/2" OD N-80 tubing inside the 7" casing; and 2) 2 7/8" OD J-55 tubing types are given below.

3 1/2" OD N-80 Tubing:

Weight: 9.30 lb/ft

Inside diameter: 2.992 inches

Drift diameter: 2.867 inches

Thread type: 8rd EUE upset

Collapse Resistance: 10,530 psi

Internal Yield Pressure: 10,160 psi

Joint Yield Strength: 207,220 lbs.

Coating: TK-70 of Tuboscope (plastic coating inside)

The 3 1/2" tubing tally is shown as exhibit L-4. The 3 1/2" tubing is 2,247.09 feet and connected with 1.10 feet long crossover to the 2 7/8" tubing. The crossover sub is with 2 7/8" RFC pin and 3 1/2" 8rd EUE box.

2 7/8" OD J-55 Tubing:

Weight: 6.40 lb/ft
Inside diameter: 2.441 inches
Drift diameter: 2.347 inches
Thread type: RFC (Reed Flush Coupling)
Collapse Resistance: 8100 psi
Internal Yield Pressure: 7700 psi
Joint Yield Strength: 49,450 lbs.
Coating: TK-77 of Tuboscope (plastic coating inside)
The tally is in Exhibit L-4.

Packer (Injection):

4 1/2" x 2 7/8" Baker Model "R" Double Grip Packer set at 4690.83 feet depth. The packer is connected to the 2 7/8" tubing by a crossover sub (2 7/8" 8rd EUE pin X 2 7/8" RFC box).

The packer is plastic coated and its technical information is presented in Exhibit L-5.

Cement Program:

Conductor Pipe – 13 3/8" conductor pipe is set at 42 feet depth and cemented with 100 sacks of Class A cement and 2 sacks of Calcium Chloride. The cement was circulated to the surface. The cement job ticket is included in Exhibit L-6. ✓

Surface Casing – 9 5/8" K-55 casing is set from 471 feet depth to the surface and cemented with 300 sacks of Class A cement and 4 sacks of Calcium Chloride. Three centralizers were used. The cement was circulated to the surface. The cement job ticket and report of the U.S. EPA representative are included in Exhibit L-6. Cement Bond Log for this casing is included in Appendix D. ✓

Long String – 7" K-55 casing is set from 2542 feet depth to the surface and cemented with 450 sacks of Class A cement, 2% gypsum, 3% potassium chloride, and other additives. Three cement baskets and fifteen centralizers were used. The cement was circulated to the surface. The cement job report and report of the U.S. EPA representative are included in Exhibit L-6. Cement Bond Log for this casing was run and is included in Appendix D. ✓

Liner (4 1/2" Casing) – 4 1/2" K-55 casing is set at a depth of 2300 – 4703 feet. The overlap in between 7" and 4 1/2" casings is 242 feet. The liner hanger is seven feet long, Baker Hyflo "III" type. Twenty-two centralizers were used. The liner was cemented with 650 sacks of Class A cement, 2 % gypsum, 3% potassium chloride and with additional additives. The cement was circulated to the surface. The cement job report and report of the U.S. EPA representative are included in Exhibit L-6. Cement Bond Log for this casing was run and is included in Appendix D. ✓

Logging Program:

The following logs were run in the injection well during construction:

- 1) After drilling to 471 feet depth
 - a) SP – Induction Electric Log
- 2) After Drilling to 4000 feet depth
 - a) Gamma Ray – Compensated Neutron – Litho Density

- b) Gamma Ray – Dual Induction – SP – Caliper
 - c) Digital Sonic – Gamma Ray
 - d) Formation Tester
 - e) Cement Bond Log for Surface Casing and Long String
 - f) Cement Evaluation Log for Long String
- 3) After Drilling to 6450 feet depth
- a) Gamma Ray – SP – Dual Induction – Caliper
 - b) Gamma Ray – Neutron – Density
 - c) Temperature Log
 - d) Cement Bond log
- 4) After cleaning the well and swabbing
- a) Temperature Log
 - b) Injection Tracer Log.

Copies of all the above logs are included in Appendix D.

Well Integrity Test:

All the casings (9 5/8", 7", and 4 1/2") used in the construction of the well were purchased new and had been manufactured to API standards. Also, all purchased casings and tubings were inspected by Tuboscope Company for any potential defects.

Cement jobs for each casing string were inspected by running Cement Bond Logs and a Cement Evaluation Log. Copies of these logs are included in Appendix D and they show fair to good bonding.

The tubing and packer were installed in the well on February 5, 1992 and the annulus was filled with water containing corrosion inhibitor (Halliburton Anhib). The packer and wellhead were pressure tested to 1000 psi and it was holding. The chart and job reports are shown in Exhibit L-7. The injection well was last worked over in 2008 and retested before putting it back in operation.

After completing surface facilities and testing of the well, another mechanical integrity test (MIT) was conducted in the presence of the U.S. EPA representative on October 9, 1992. The well annulus was pressurized to 309 psig and observed for half an hour and the ALERIS injection well passed MIT. The report of this test is included in Exhibit L-7.

EXHIBIT L-1

**SURFACE (9 5/8") AND LONG STRING (7") CASING
PURCHASE TICKETS**

READD

OR

15891 INVOICE NO. N2 151

READD SUPPLY, INC.26206 OAK RIDGE DRIVE
SPRING, TEXAS 77380
(713) 387-6046

Remit To:

Readd Supply, Inc.

P. O. Box 2358

Spring, Texas 77383-2358

INVOICE DATE :08/20/91

TERMS :2% 10/NET 30

S 1183

O IMCO RECYCLING
D PO BOX 1070

T SAPULPA

OK 74057

H

I IMCO

P C/O HYW 70 & GARDNER LANE

T

MORGANTOWN

KY 42261

O

Salesman HOUSTON	Customer Order No. VERBAL	Ship Via TEAM AMERICA	F.O.B. DESTINATION	Date Shipped 08/09/91	
DESCRIPTION		QUANTITY		PRICE	AMOUNT
		Jts.	Footage		
TO SANDBLAST :: 7" 23# K55- 7(313.40)		1	1.00	\$400.0000	\$400.
825.10	9 5/8" 36# K55 STC SMLS R3	11	475.70	\$14.0500	\$6,683.
826.11	7" 23# K55 LTC SMLS R3	58	2568.70	\$9.5500	\$24,531.
INSPECTION REPORT & TALLY ATTACHED					
RECEIVED AUG 23 1991					
AUG 29 1991					

NOTE: Discount in the amount of \$632.29
allowed if payment is received by
08/30/91

TOTAL INVOICE: \$31,614

Release No. RS#4876

NO CREDIT ALLOWED ON GOODS RETURNED WITHOUT PERMISSION.
DUE AND PAYABLE IN MONTGOMERY COUNTY TO READD SUPPLY, INC.THERE WILL BE A SERVICE CHARGE OF
PER MONTH ON ACCOUNTS AFTER 30 DA

Carbonless
IMPROVED COPY

Shipper's No. 1-1111

Carrier's No.

RECEIVED, subject to the classifications and tariffs in effect on the date of the issue of the Bill of Lading.

the property described below, in apparent good order, except as noted (contents and conditions of contents of packages unknown), marked, consigned, and destined as indicated below, which said carrier is to transport this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said carrier on the route to said destination. It is mutually agreed, as to each carrier of all any of said property over all or any portion of said route, that the carrier of said property shall be subject to the terms and conditions of the Uniform Freight Classification and the Uniform Motor Carrier Classification and Tariff (if in Official, Southern, Western and Illinois Freight Classification or tariff) in effect on the date thereof, or if this is a rail or rail-water shipment, or if in the applicable motor carrier classification or tariff (if this is a motor carrier shipment).

Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, including those on the back thereof, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

Consigned to

(Mail or street address at consignee — For purposes of notification only)

Destination _____ State _____ Zip _____ County _____ Address _____ Delivery Address _____

*To be filled in only when shopper desires and governing tariffs provide for delivery thereof!

Route

Delivering Carrier	Car or Vehicle Initials
✓	-

[illegible]

Shipper, Per.

Agent. Per.

Permanent post-office address of shipper.

Wilson Jones
Carbonless

is an acknowledgment that a Bill of Lading has been issued and is not the Original Bill of Lading, nor a copy or duplicate, covering the property named herein, and is intended solely for filing or record.

Carrier's No.

RECEIVED, subject to the classifications and tariffs in effect on the date of the issue of the Bill of Lading.

[illegible]

Shipper hereby certifies that he is familiar with all the terms and conditions of the said bill of lading, including those on the back thereof, set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

Consigned to Residual Supply Co. 1700 Ave (Mail or street address of consignee—For purpose of notification only.)

Destination Wilmington State Ky Zip 40399 Delivery Address 11470
*To be filled in only when shipper desires and governing tariffs provide for delivery thereof.)

Route 502-526-5100
Gardner Lane

Delivering Carrier Valley 418 Car or Vehicle Initials _____ No. _____

No. Packages	Kind of Package, Description of Articles, Special Marks, and Exceptions	"WEIGHT" (Subject to Correction)	Class or Rate	Check Column
3138	17" X 23 1/2" Steel Pipe			
	Release 25617			
	Total Freight	12.22		
	0.00 = 2.21 3.01 5.10			

If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is carrier's or shipper's weight.

NOTE—Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.

The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding _____ per _____

The fibre boxes used for this shipment conform to the specifications set forth in the bus maker's certificate thereon, and all other requirements of the Consolidated Freight Classification.

Subject to Section 7 of Conditions of Carriage, if this shipment is to be delivered to the consignee without receipt on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of Consignor)

If charges are to be prepaid, write or stamp here, "To be Prepaid."

Received \$ _____ to apply in payment of the charges on the property described herein.

Agent or Cashier

Per _____ (The signature here acknowledges only the amount prepaid.)

Charges Advanced: \$ _____

Shipper's imprint in lieu of stamp, put a part of bill of lading approved by the Interstate Commerce Commission.

Agent, Per _____

Permanent post office address of shipper: _____

Wilson Jones
44 Hill Street, Philadelphia, Pa. U.S.A.
Telephone:

BUCKBOARD CARRIERS, INC.

This is your ORIGINAL INVOICE
(non-negotiable)

BK-200

SHIPPER NO. 9165 70

Shipper 713-367-6046

AMERICAN PIPE INS'D

3812. DATES RD.

HOUSTON TEXAS

3680 Shepard Road • P.O. Box 648 • Perry, Ohio 44081

PRO NO. 081-059

DATE

The original paid freight bill must be surrendered
with claims for overcharge, loss or damage.

Phone (Area Code 216) 259-5257

Fax 216-259-3841

DATE 8-16-91

Consignee

READY SUPPLY

CP MORGAN TOWN KY

Tractor No. 104 Trailer No. 104A

No. Pieces	DESCRIPTION	WT/MILES	RATE	TOTAL CHGS.	Received in good condition except as noted.
37	7" 17" X 23" KSSK 320 1326.40' 7" 23" KSSK 320 SANDBLAST, 1 FL FTS 31340	37.715			Firm By Keith Helton NOTICE: Demurrage charges on scheduled shipments as follows: \$7.50 per quarter hr. after the first 2 hrs. Pick up date Del'd date Time In Time Out Driver

ICC REGULATIONS REQUIRE PAYMENT
OF THIS BILL IN 7 DAYS.

WHITE COPY - DELIVERY CANARY COPY - CUSTOMER PINK COPY - DRIVER

EXHIBIT L-2

**LINER CASING (4 1/2") TALLY AND
PURCHASE TICKETS**

TUBOSCOPE INC.
PIPE TALLY SHEET

DATE 11/22/91

CUSTOMER READD SUPPLY DISPOSAL WELL

LOCATION EDMOND, OK. REC. PLANT W/O NO. 245489

SIZE 4 1/2" WEIGHT 10.50 LB/FT. GRADE K-55

TYPE OF CONNECTIONS STIC MFG. USS

TYPE OF COATING 1 WHITE BAND (TAILED THROSDN)

	FEET		FEET		FEET		FEET		FEET	
1	40	18	44	61	44	66				
2	44	90	39	43	44	05				
3	44	92	44	15	44	26				
4	44	91	44	75	42	41				
5	44	97	44	97	44	31				
6	44	97	36	54	43	42				
7	44	62	44	93	44	28				
8	44	96	44	91	43	37				
9	44	97	40	71	42	19				
10	38	02	44	56	44	31				
11	44	62	44	98	44	36				
12	44	94	41	50	41	82				
13	44	83	43	32	44	39				
14	44	61	35	73	42	98				
15	44	96	44	31	44	04				
16	45	72	42	82						
17	44	91	45	53						
18	44	65	44	26						
19	44	92	44	30						
20	44	91	44	36						
	886	49	860	67	654	85				

NO PIECES 55 NO FEET 2,402.01'

TALLIED BY Ray R. Galt

THIS SHIPPING ORDER

must be legibly filled in, in ink, in inside French or in
Carbon, and retained by the Agent.

Shipper's No. W034 245489

Carrier's Name: Phoenix Truck & Auto, Inc.

Carrier's No. 40226

RECEIVED subject to the classifications and liability filed tariffs in effect on the date of the issue of this Bill of Lading.

at SPRINGFIELD (Date) 11/22 1991 FROM BRAD LINDLEY

the property described below, at applicant's order, except as noted (contents and condition of packages unknown), marked, counted, and delivered as shown below, which said company (the word company being understood throughout this document as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its own railroad, water line, highway, route or route, or within the territory of its highway operations, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed, as to each carrier of all or any portion of said property, that every carrier shall be held responsible for the safe delivery of the property in all the conditions not prohibited by law, whether printed or written, terms contained, including the conditions on back hereof, which are hereby agreed to by the shipper and accepted for himself and his assigns.

Consigned TO LMED PACKAGING INC (full or street address for purposes of notification only)
On Order of Shipper, Shipper's name or an otherwise provided in Item 430, Sec. 1

Destination SPRINGFIELD Street Market Street City SPRINGFIELD State MASSACHUSETTS Zip 01104

Route PHOENIX County KENTUCKY Delivery Address Star State KY City SPRINGFIELD Zip 40060

Delivering Carrier Kentucky Car or Vehicle Initials and No. 2003/4800

Collect on Delivery \$ And Remit to

No	HL	Kind of Package, Description of Articles, Special Marks, and Exemptions	Weight (Subject to Correction)	Class or Rate	Commodity
55		2402.01' 4 1/2" 10500 K55 5TC R-3	25221		
		WHITE BOARD			
		ARRIVAL 1:30 PM			
		STAY UNLOADING 2:15 PM			
		QUIT UNLOADING 2:50 PM.			

If the shipper is insured by a carrier, the carrier requires that the bill of lading shall state whether it is carrier's or shipper's weight.

NOTE: Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.

The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding

Permanent post-office address of shipper.

Shipper, Per PL

Agent must detach and retain the Shipping Order and sign the Original Bill of Lading.

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without payment of freight, the carrier shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of consignee)
C. O. D. Charges to be paid by ☐ Shipper ☐ Consignee

If charges are to be prepaid, write in stamp "Prepaid" to be filled in by the shipper.
Prepaid

Received & in apply in payment of the charges on the property described herein.

Agent or Cashier

The signature hereof is required only if the amount involved is
Change Advanced PL

1. The three containers used for this shipment conform to the specifications set forth in the rules and regulations of the National Motor Freight Classification and Rule 5 of the National Motor Freight Classification.
2. Shipper's interest in the goods and a part of the bill of lading is hereby assigned by the Interstate Commerce Commission.

READD SUPPLY, INC.
25206 OAK RIDGE DRIVE
SPRING, TEXAS 77380
(713) 367-6046

Readd Supply, Inc.
P. O. Box 2358.

INVOICE DATE : 11/25/91

Spring, Texas 77383-2358 TERMS : 2% 10/NET 30

SOLD TO
1183
IMCO RECYCLING
P. O. BOX 1070
SAPULPA, OK. 74057

SHIP TO
IMCO
C/O MORGANTOWN, KY

Salesman	Customer Order No.	Ship Via	F.O.B.	Date Shipped
CULLISON	VERBAL	E.L. FARMER	LOADED TRUCKS	11/22/91
DESCRIPTION	QUANTITY		PRICE	AMOUNT
	Yds.	Footage		
994.10 4 1/2" 10.50# K55 STC SMLS R3 OUTBOUND AFTER INSPECTION	55	2402.01	\$5.9500	\$14,291.50

NOTE: Discount in the amount of \$285.83
allowed if payment is received by
12/05/91.

TOTAL INVOICE: \$14,291.50

Release No. RS#5108

NO CREDIT ALLOWED ON GOODS RETURNED WITHOUT PERMISSION.
DUE AND PAYABLE IN MONTGOMERY COUNTY TO READD SUPPLY, INC.

THERE WILL BE A SERVICE CHARGE OF 1%
PER MONTH ON ACCOUNTS AFTER 30 DAYS

EXHIBIT L-3

**LINER HANGER AND HANGER JOB
DATA**



A Baker Hughes company

LINER TOOL REPORT

BST-20-36

FORM DISTRIBUTION

- (1) WHITE-DISTRICT FILE
- (2) YELLOW-QA HOUSTON
- (3) PINK-REG'N. MGR.

☐ Normal Job
☐ Unsatisfactory Job
☐ Interim/Prototype Job

For Eng. Use Only:

1 2 3 4 5 6 7 8 9 0

Customer IMCO Recycling Inc. Date 11-27-91 SSI# 717-76876 717-76877
 Field/Block _____ Lease IMCO Injection Well 1
 Dist. Mgr. _____ BST District Okla. City, Ok. Job Log No. _____

1. WELL INFORMATION: Cased Hole Depth 2542 Open Hole Depth 6450'
 Deviation _____ True Vertical Depth 6450
 Hole Problems (lost circulation, tight spot, etc.): Tight @ 4429'
 Csg. size 7 Weight 23 Grade K-55 Shoe @ 2542

2. LINER INFORMATION: Size 4 1/2 Weight 10.5 Grade K-55 Threads 8RD ST&C
 Length 2399.38 Top 2318.62 Overlap 223.38' Pick-up Wt. 40 Slack-off Wt. 32

3. DRILL PIPE: Size 2 7/8 Weight 7.9 Grade N-80 top
 Size _____ Weight _____ Grade _____ blm Running Speed 1 min. std
Hung Liner 1732' off Btm @ 4718'

Tool Description	Commodity No.	O.D.	I.D.	Length	Depth	Y/N
Formation Pkr. Pack-off Shoe		53/4	4.052	2.42	4715.58	Y
1 Jt. 4 1/2" 10.5# K-55		4 1/2	4.052	35.35	4680.29	
LANDING COLLAR		5	4.052	.92	4679.31	Y
54 Jts. 4 1/2" 10.5# K-55		4 1/2	4.052	2354.56	2324.75	
X-over Bshg.		5 9/16	4.052	.75	2324.00	Y
HyFlo HANGER		5	4.276	4.29	2319.71	Y
R.H. Sleeve		5 3/4	4.276	1.09	2318.62	Y

4. SETTING RESULTS: _____ psi applied to set hydraulic hanger. Pressure to shear out seat in #2 landing collar _____ (if applicable). Did hanger set? (yes ☒ or no _____). Rounds to release setting tool 10
 Press. to Rel. Hyd. Setting Tool _____. Right-hand set ☒, or left-hand set _____? Rounds to set hanger 2
 Picked up 3 to check for liner weight loss. Total weight loss 22 K

5. CONDITIONING: Mud circulated after liner on bottom 2 hours @ 2 1/2 bbls/minute. Mud weight 8.8
 Maximum pressure 350 circulated before (_____) or after (_____) hanger was set?

6. CEMENT JOB: Weight on setting tool while cementing 16 K. Cemented by Dowell
 Calculated pumping time 2 hr. 15 min. Pumped water or spacer ahead of cement 20 BBLS. Behind cement Water. Cement weight 14.8. Percent of excess 35 % Start mixing @ 0250
 Finish displacing plug at 0355. Max. pressure 1300. Displacement rate 5

7. PLUG DISPLACEMENTS: Pumpdown plug bumped up at 12. Calculated displacement 12
 Pressure from 710 to 290 to shear plugs. Liner wiper plug bumped up at 50
 Calculated displacement 49.7. Pressure plugs bumped at 1300 To 2000

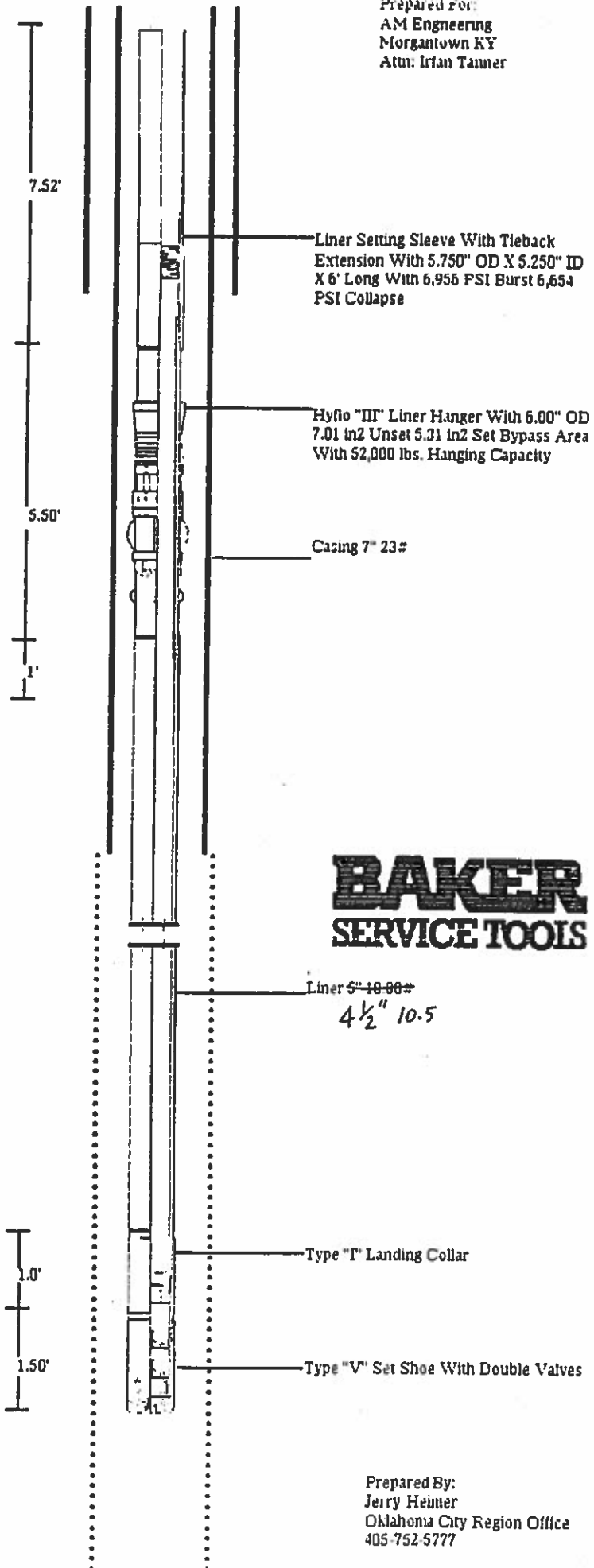
8. FOLLOW-UP ACTION REQ'D: ☐ Yes ☐ No

9. COMMENTS: _____

Baker Rep. Signature

Customer Rep. Signature

Prepared For:
AM Engineering
Morgantown KY
Attn: Irian Tanner



Prepared By:
Jerry Heimer
Oklahoma City Region Office
405-752-5777

EXHIBIT L-4

**TUBING (3 1/2" AND 2 7/8") TALLY, PURCHASE TICKETS
AND TECHNICAL DATA FOR 2 7/8" TUBING**

OFFICE: 5432 E. 5th Place
TULSA, OKLA. 74112

H. CHAPMAN
Phone 836-5810, Tulsa, Okla. 74112

CHAPMAN
OIL & GAS WELL SALVAGING CO.
HYDRAULIC CASING PULLING CONTRACTORS
TULSA, OKLA.

COMPANY <u>IMCO Reamling Inc</u>						DATE <u>2-5-92</u>					
LEASE NAME <u>Imca disposal No. 1</u>						LOCATION <u>Butterfly Key</u>					
Size O.D. <u>3 1/2</u>		Weight <u>9.3</u>		Thread <u>8R15HE</u>		<u>N-80</u> 55		Kind <u>New</u>		<u>Interconnect</u>	
Jts.	Feet	Ins.	Feet	Ins.	Feet	Ins.	Feet	Ins.	Feet	Ins.	
1	30	81	30	60	30	74	30	71	30	93	
2	30	67	30	58	30	78	30	70	30	62	
3	30	63	30	84	30	81	30	83	30	68	
4	30	51	30	44	30	44	30	64			
5	30	61	30	61	30	83	30	50			
6	30	89	30	53	30	66	30	94			
7	30	69	30	89	30	76	30	64			
8	30	48	30	78	30	78	30	72			
9	30	65	30	74	30	37	30	49			
10	30	38	30	79	30	59	30	83			
11	30	83	30	79	30	64	30	75			
12	30	75	30	69	30	45	30	44			
13	30	58	30	43	30	63	30	61			
14	30	43	30	84	30	83	30	13			
15	30	60	30	53	30	71	30	75			
16	30	63	30	90	30	52	30	53			
17	30	73	30	71	30	58	30	53			
18	30	88	30	79	30	70	30	35			
19	30	65	30	63	30	82	30	93			
20	30	89	30	97	30	95	30	81			
Total	613	59	613	98	613	59	612	83	92	23	

Tallied By <u>[Signature]</u>	Totals
Received By <u>[Signature]</u>	Joints 83
	Feet 2546
	Ins. 22

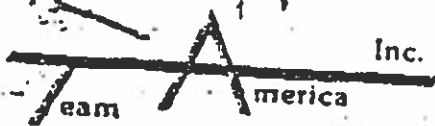
Dr. E: 5432 E. 5th Place
TULSA, OKLA. 74112

H. CHAPMAN
Phone 836-5810, Tulsa, Okla. 74112

CHAPMAN
OIL & GAS WELL SALVAGING CO.
HYDRAULIC CASING PULLING CONTRACTORS

TULSA, OKLA.

COMPANY <i>IMCO Recycling INC.</i>						DATE <i>2-5-92</i>					
LEASE NAME <i>IMCO DISPOSAL</i>						LOCATION <i>Butler City, Ky</i>					
Size O.D. <i>2 7/8</i>		Weight <i>6.4</i>		Thread <i>RFL</i>		<i>J-55</i>		Kind <i>New</i>		<i>in factually Contest</i>	
Jts.	Feet	Ins.	Feet	Ins.	Feet	Ins.	Feet	Ins.	Feet	Ins.	
1	31	33	31	33	31	38	30	02			
2	31	41	31	25	31	13	31	40			
3	31	40	31	39	31	12	31	44			
4	31	40	31	40	31	38	31	40			
5	31	39	30	98	30	88	31	41			
6	31	40	31	26	31	39	31	40	<i>Packer</i>	<i>7.00</i>	
7	31	42	31	43	31	39	31	—	<i>Sub</i>	<i>1.10</i>	
8	31	15	31	43	31	43	31	33	<i>Sub</i>	<i>1.10</i>	
9	31	13	31	38	31	42	31	14			
10	31	39	31	02	30	72	31	39			
11	31	32	31	40	31	38	31	40			
12	31	41	31	38	31	28	31	43			
13	31	26	31	41	31	41	31	40			
14	31	—	31	39	31	41	31	43			
15	30	93	31	43	31	42	31	10			
16	31	10	31	48	31	09	30	92			
17	30	86	30	72	31	39	31	41			
18	31	41	30	66	30	72	31	40			
19	31	42	31	40	30	77	31	40			
20	31	04	31	39	31	40					
Total	623	19	625	58	624	51	593	82			
Tailed By <i>B. B. A. H.</i>						Totals					
Received By <i>B. B. A. H.</i>						Joints <i>79</i>		Feet <i>2467</i>		Ins. <i>10</i>	



TH9377

(214) 775-5476

3 Road Supply
2 26206 Oakridge Drive
0 Spring, TX 77380

IMCO
KS#5141
ILV 10516

invoice

TH9377	DATE BILLED 01-02-92
Road Supply c/o IMCO Morgantown, KY	

ACCOUNT NO.	DATE SHIPPED	CARRIER	TERMS	ORDER NUMBER
	12-21-91	Team America JES Trucklines	Net 7	RSS141
DESCRIPTION			RATE	CHARGE
79 1	2 7/8 6-4 - RPC J55 R2 3 1/2 x 2/7/8 Crossover		15,880# as 45,000#	2.29 cwt \$1030.50
TUBESCOPE Houston, TX			4104 .110	
Shipped				
Refer's invoice for the freight charges paid or on your behalf and may include service and/or commissions when applicable.			REMIT TO: Team America, Inc. PO Box 731 Midlothian, Texas 76065 0731	
30 DAYS since Charge On All Past Due Balances 183070			PAY THIS AMOUNT \$1030.50	

OSCOP

DATE _____

CUSTOMER

Pip Add Solv

LOCATION

WFO

NO 245785

SIZE

27/8

WEIGHT

6.4

GRADE

J55

TYPE OF

CONNECTIONS

RFC

WFC

TYPE OF

COATING

TX77

	FEET	FEET	FEET	FEET	FEET
1	2910	3160	3160	3160	
2	3120	3160	3160	3160	
3	3150	3160	3160	3160	
4	3150	3160	3040	3150	
5	3130	3160	3160	3170	
6	3160	3170	3150	3170	
7	3160	3110	3150	3160	
8	3140	3170	3150	3160	
9	31 -	3130	3150	3160	
10	3130	3150	3150	3160	
11	3140	3150	3160	3150	
12	3070	3160	3160	3160	
13	3160	3040	3160	3160	
14	3150	3170	3160	3160	
15	3160	3120	3030	3160	
16	3150	3110	3140	31 -	
17	3150	3130	3150	31 -	
18	3140	3120	3140	3160	
19	3140	3170	3160	3160	
20	3150	3060	3160		
62560 62760 629 - 59920					

NO PIECES

79

NO FEET

2481.40 ✓

TALLIED BY

PRINTED IN USA

FORM NO 600 REV 7/90

Form 200/Rev. 8-

RFC™

Flush OD liner connector

30° torque shoulder and metal seal

This external torque shoulder ensures the pin and box are exactly positioned. Most of the makeup torque is applied to this shoulder, which generates a metal seal for collapse pressure rated to the API minimum collapse rating for the pipe. This seal also serves as a backup to the pin nose seal.

Two-step thread design

This non-tapered, non-interference thread form minimizes galling and thread-generated stresses.

Center-step torque shoulder

This shoulder performs as an additional torque shoulder, storing a small amount of torque and helping to prevent overmakeup.

14° metal seal

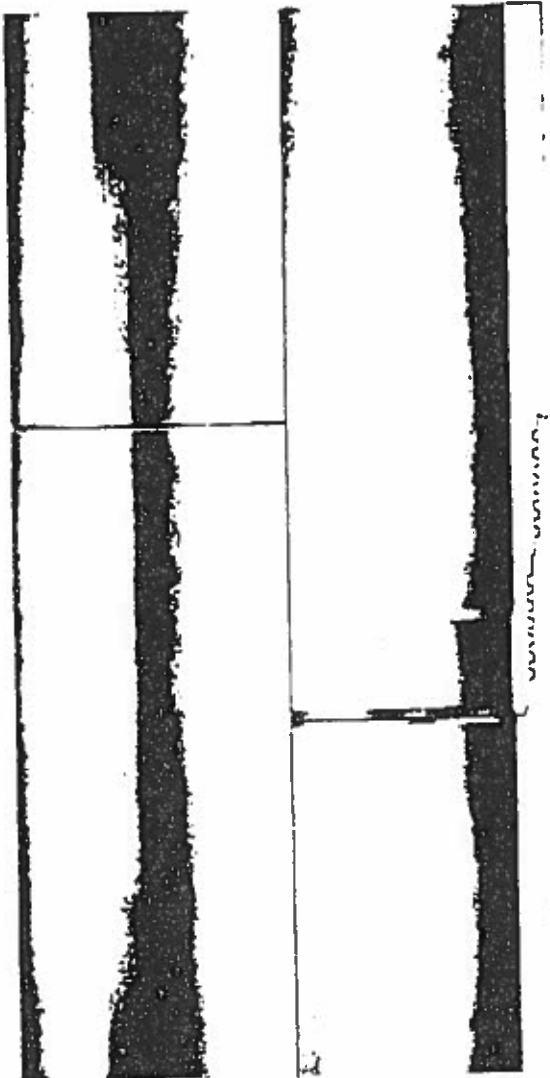
This pin nose seal is created by radial interference and is rated to the API hydrostatic test pressure for the pipe.

Formed pin member

The pin end is swaged inward and then machine bored to ensure proper pin nose seal geometry without restricting driftability. This forming is done at ambient temperature, prior to threading, and is stress relieved.

Interchangeability

The RFC design is interchangeable with the Hydril FJ™ connector, except for those weights indicated in the adjacent tables.



RFC

Pipe data						Connector data						Connector strength data											
Size	Nominal weight	Plain weight	Nominal wall thickness	Nominal ID	API spec 5L	Screw pin ID	Max. wt loss	Connector tension cross-sectional area	Nominal tension efficiency	Connector compression cross-sectional area	Nominal compression efficiency	J-55		K-55		L-80		N-80		High Collapse -95		P-105 - P-110	
												Min. setting load	Setting depth FOS=1.8	Min. setting load	Setting depth FOS=1.8	Min. setting load	Setting depth FOS=1.3	Min. setting load	Setting depth FOS=1.8	Min. setting load	Setting depth FOS=1.8	Min. setting load	Setting depth FOS=1.8
in	lb/ft	lb/ft	in	in	in	in	in	in ²	%	in ²	%	1,000 lb	ft	1,000 lb	ft	1,000 lb	ft	1,000 lb	ft	1,000 lb	ft	1,000 lb	ft
												P-105											
2-3/8	4.70	4.43	0.190	1.995	1.901	1.945	2.09	0.812	48.8	0.280	30.4	45	3.730	58	7.290	61	7.670	67	8.440	73	9.200		
	1.95	5.76	0.254	1.867	1.772	1.817	2.08	0.864	37.0	0.484	27.2	72	3.960	91	8.840	98	9.310	108	10.240	115	11.170		
	6.50	6.18	0.217	2.441	2.247	2.351	2.12	0.893	48.3	0.459	26.4	88	6.040	54	7.550	86	8.590	86	8.650	107	9.680		
2-7/8	7.90	7.68	0.279	2.373	2.229	2.381	2.12	0.893	39.6	0.489	20.8	88	4.790	85	8.160	89	8.450	98	7.710	107	7.780		
	8.70	8.44	0.308	2.259	2.155	2.259	2.12	0.893	34.0	0.463	19.3	96	4.400	84	7.390	89	7.870	98	8.460	107	7.090		
	10.30	9.91	0.289	2.922	2.797	2.942	2.64	1.448	33.1	0.786	27.7	99	6.290	125	7.860	123	8.380	146	9.230	158	10.060		
3-1/2	8.30	8.61	0.254	2.792	2.647	2.830	2.62	1.330	31.3	0.688	27.3	116	6.500	147	8.240	134	8.670	170	9.540	185	10.410		
	10.30	9.91	0.289	2.922	2.797	2.942	2.64	1.448	33.1	0.786	27.7	154	6.380	188	8.840	268	9.310	227	10.240	247	11.170		
	12.80	12.31	0.368	2.764	2.639	2.884	2.64	1.064	37.0	0.989	27.1	154	6.380	188	8.700	263	9.190	227	10.070	247	10.950		
4	12.85	12.32	0.375	2.755	2.625	2.876	2.64	1.064	36.1	0.989	28.6	154	5.870	198	7.440	268	7.330	227	8.930	247	9.400		
	15.60	14.63	0.449	2.602	2.477	2.522	2.64	1.064	46.6	0.960	21.7	154	5.500	198	7.080	268	7.460	227	8.260	247	8.950		
	15.60	15.37	0.476	2.548	2.423	2.468	2.68	1.064	46.6	0.960	21.7	154	5.500	198	7.080	268	7.460	227	8.260	247	8.950		
5	9.50	9.11	0.226	3.548	3.423	3.463	2.92	1.229	46.3	0.894	23.6	92	6.820	118	7.120	122	7.490	135	8.340	147	8.890		
	11.00	10.46	0.262	3.476	3.351	3.396	2.92	1.849	32.6	0.894	28.5	123	6.560	138	8.320	164	8.750	181	8.830	197	10.500		
	11.60	11.34	0.284	3.428	3.303	3.348	2.92	1.863	34.0	0.894	27.2	139	6.820	171	8.290	182	8.630	186	8.710	216	10.880		
5-1/2	13.40	12.63	0.330	3.349	3.215	3.260	2.64	1.899	32.5	1.008	26.8	148	6.440	189	8.150	199	8.580	219	9.440	232	10.300		
												P-110											
4-1/2	9.50	9.40	0.205	4.090	3.955	3.990	2.92	1.162	42.0	0.974	33.7	110	6.520	110	8.520	118	8.860	127	7.990	145	8.580		
	10.50	10.23	0.224	4.062	3.927	3.962	2.92	1.405	46.7	0.974	32.8	133	7.340	133	7.240	140	7.630	154	8.380	175	8.530		
	11.80	11.35	0.250	4.000	3.875	3.900	2.92	1.734	51.9	0.974	29.6	184	8.060	164	8.060	175	8.480	190	9.330	218	10.600		
5	12.80	12.24	0.271	3.958	3.823	3.878	2.92	1.891	52.5	0.874	27.4	179	8.150	179	8.150	189	8.580	208	9.440	238	10.720		
	13.50	13.04	0.290	3.920	3.785	3.940	2.92	1.891	48.3	0.874	25.8	179	7.650	178	7.550	189	8.050	234	8.860	238	10.670		
	15.50	14.98	0.337	3.925	3.701	3.748	2.75	2.318	52.6	1.328	30.4	220	8.170	220	8.170	231	8.820	255	9.460	289	10.750		
5-1/2	18.80	18.19	0.430	3.848	3.615	3.560	2.75	2.318	42.2	1.328	24.4	220	6.540	220	6.540	231	8.290	255	7.580	289	8.610		
	15.00	14.87	0.296	4.106	4.023	4.028	2.93	2.804	50.4	1.180	26.9	209	7.820	209	7.820	220	8.230	242	9.050	275	10.290		
	18.30	17.93	0.362	4.276	4.151	4.186	3.00	2.806	52.2	1.479	28.3	268	8.250	268	8.250	276	8.890	324	9.560	350	10.880		
5-1/2	20.30	20.01	0.408	4.184	4.058	4.104	3.00	2.806	47.7	1.479	25.4	268	7.400	264	7.400	276	7.790	308	8.580	350	9.730		
	20.84	20.53	0.422	4.156	4.031	4.078	3.00	2.806	46.2	1.479	24.6	268	7.170	268	7.170	280	7.550	324	8.310	350	9.440		
	23.20	22.88	0.478	4.044	3.918	3.984	3.00	2.806	41.3	1.479	22.0	268	6.418	266	6.418	286	6.810	328	7.420	350	8.440		
5-1/2	24.10	24.03	0.500	4.060	3.875	3.926	3.00	2.806	38.7	1.479	21.1	268	6.160	284	6.160	280	6.450	304	7.350	350	8.130		
	15.50	15.26	0.375	4.958	4.825	4.870	3.37	2.230	49.4	1.303	28.2	311	7.860	311	7.860	323	8.070	345	8.870	378	10.020		
	17.00	16.87	0.304	4.882	4.707	4.812	3.37	2.521	50.8	1.303	28.6	339	7.860	339	7.860	352	8.350	377	9.130	415	10.370		
5-1/2	20.00	19.81	0.381	4.778	4.633	4.688	3.43	3.113	53.4	1.579	27.4	395	8.290	395	8.290	411	8.730	442	9.500	485	10.910		
	22.00	22.54	0.415	4.870	4.645	4.590	3.43	3.113	47.0	1.579	24.1	395	7.280	395	7.280	411	7.870	442	8.440	485	9.590		
	28.00	25.54	0.478	4.648	4.423	4.468	2.43	3.113	41.4	1.579	21.2	395	6.430	394	6.430	411	6.770	442	7.440	485	8.460		

1. RFC CONNECTOR PRESSURE RATINGS

COLLAPSE — pressure rated to the API Collapse pressure rating for the pipe body.

INTERNAL — pressure rated to 91.4% of the API Minimum Internal pressure rating for the pipe body.

HYDROSTATIC TEST — pressure rated to 87.5% of the API Hydrostatic pressure rating for the pipe body.

2. RFC designs grouped together by weights, as shown above, are interchangeable with each other.

3. All of the RFC designs displayed above are weaker in tension than the pipe body. The minimum parting loads displayed were calculated by multiplying the connector tension cross-sectional area by the minimum ultimate (tensile) strength for the considered grade of pipe. To calculate this rating for a grade of pipe not displayed, determine the grade's minimum ultimate strength rating and multiply it by the connector tension cross-sectional area. The value assigned as the minimum ultimate strength rating for the high-collapse -95 grade shown above was 110,000 psi, although this value may vary by mill.

4. The setting depth values displayed above were calculated by dividing the connector's minimum parting load rating by the plain end pipe weight in air and the factor of safety displayed. To determine the factor of safety for a particular string length, use the following equation:

$$\text{Factor of Safety (FOS)} = \frac{\text{Connector Minimum Load Rating}}{\text{String Length} \times \text{Pipe Weight in Air}}$$

These values do not consider buoyancy or any other downhole effect and are displayed for reference only.

5. The compressive cross-sectional areas listed above can be used to calculate the elastic (yield) compressive strength of the RFC connector using the following equation:

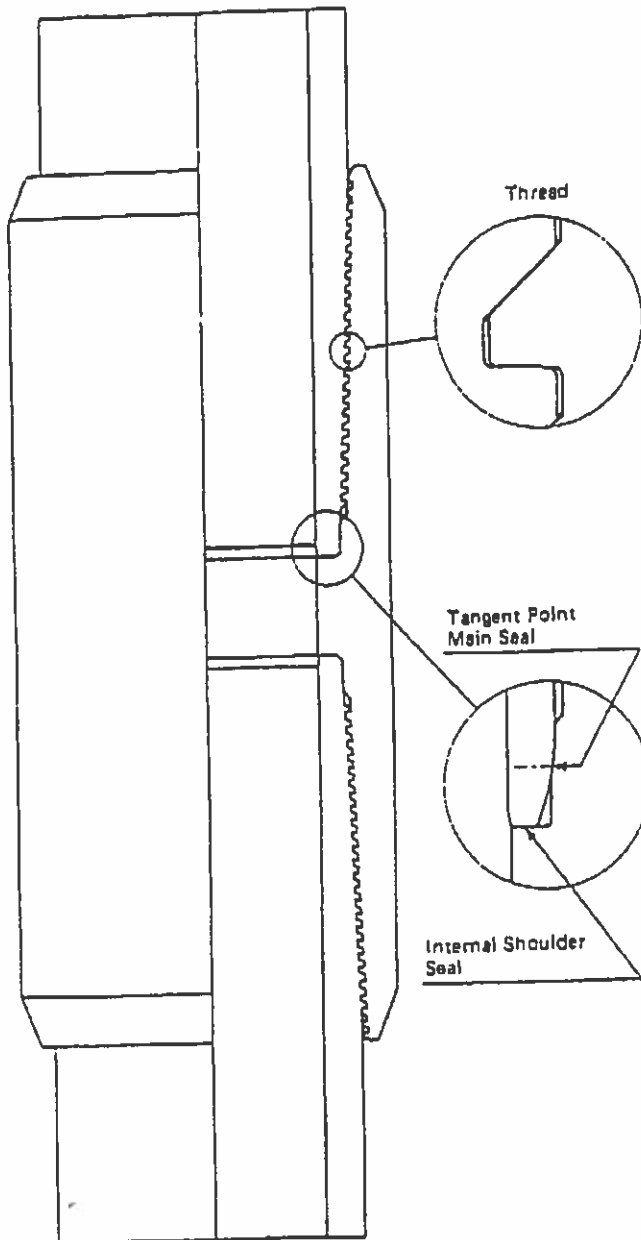
$$\text{Elastic compressive strength} = \text{compressive cross-sectional area} \times \text{minimum yield strength of the considered grade.}$$

6. Material geometry for accessories is available upon request by calling the Houston facility at 713-230-6350.

a This is nominal pipe ID and is used as pin ID for accessory blanking purposes.

* Interchangeable with Hydril's FJ flush OD connector.

DESIGN PRINCIPLE OF NK 3SB TUBING



1. Threaded and Coupled Connection Applied to Non-upset Pipe
2. Two Metal to Metal Seals
Sliding Type Seal with Tangent Point Contact and Internal Shoulder
3. Positive Torque Stop in Internal Shoulder
4. Internal Flush - Smooth Bore
5. Flat Crested Thread Parallel to Pipe Axis
8 Threads per Inch
6. Load Flank Zero degree
Stabbing Flank 45 degrees
7. Tapered and Runout Type Thread
Taper 1/16
8. Precision Machining



RECOMMENDED MAKE-UP TORQUE

NK3SB TUBING (Regular Coupling)

(ft-lbs)

Size O.D. (in)	Nominal Weight (lb/ft)	Wall Thickness (in)	Grade			
			J55	C75 N80 L80 AC80	AC90 AC95 C95	P105 NK125
2-3/8	* 4.70	0.190	1,200	1,200	1,300	1,400
	* 5.30	0.218	1,400	1,500	1,500	1,600
	5.95	0.254	1,600	1,800	1,900	1,900
	6.20	0.261	1,700	1,800	1,900	1,900
	7.70	0.336	2,000	2,200	2,300	2,400
2-7/8	* 6.50	0.217	1,800	2,000	2,100	2,200
	7.90	0.276	2,100	2,300	2,400	2,500
	8.70	0.308	2,300	2,600	2,700	2,800
	9.50	0.340	2,500	2,800	3,000	3,100
	10.70	0.392	2,800	3,300	3,500	3,700
	11.00	0.405	2,800	3,300	3,500	3,700
	11.65	0.440	2,800	3,300	3,500	3,700
3-1/2	9.30	0.254	2,700	2,900	3,100	3,300
	10.30	0.289	3,100	3,400	3,600	3,800
	12.80	0.368	3,900	4,400	4,600	4,900
	12.95	0.375	3,900	4,400	4,600	4,900
	15.10	0.449	4,500	5,000	5,300	5,700
	15.80	0.476	4,500	5,000	5,300	5,700
	16.70	0.510	4,600	5,200	5,500	5,900
	17.05	0.530	4,600	5,200	5,500	5,900
4	11.00	0.262	3,600	4,000	4,100	4,300
	13.40	0.330	4,400	5,000	5,200	5,400
	19.00	0.500	6,000	6,700	7,000	7,500
	22.50	0.610	6,400	7,000	7,300	7,800
12	* 12.75	0.271	3,500	3,900	4,100	4,300
	13.50	0.290	4,200	4,700	4,900	5,200
	15.50	0.337	5,000	5,500	5,800	6,300
	19.20	0.430	6,000	7,000	7,500	8,000
	21.60	0.500	6,200	7,500	8,000	8,500
	24.00	0.560	6,500	7,700	8,500	8,700
	26.50	0.630	6,500	7,700	8,500	8,700

with *

torque values are 110% of optimum torque.

torque values are 90% of optimum torque.

values are 120% of optimum torque.

values are 80% of optimum torque.

$\gamma = 0.90 \times \text{Regular}$



DIMENSION & PROPERTIES OF NK 3SB TUBING

Pipe					Coupling (in)			Pin Length (in)	(A)
O.D. (in)	Nominal Weight (lb/ft)	Wall Thickness (in)	I.D. (Nominal) (in)	Drift Diameter (in)	O.D.		Length (in)		Pipe Section (Nominal) (Sq. in)
					Regular	Special			
2-3/8	4.70	0.190	1.995	1.901	2.875	2.700	8.472	3.743	1.304
	5.30	0.218	1.939	1.845		2.700			1.477
	5.95	0.254	1.867	1.773		2.732			1.692
	6.20	0.261	1.852	1.758		2.744			1.733
	7.70	0.336	1.702	1.608		-			2.152
2-7/8	6.50	0.217	2.441	2.347	3.500	3.220	8.472	3.743	1.812
	7.90	0.276	2.323	2.229		3.280			2.254
	8.70	0.308	2.259	2.165		3.323			2.484
	9.50	0.340	2.194	2.100		3.366			2.708
	10.70	0.392	2.090	1.996		-			3.058
	11.00	0.405	2.064	1.970		-			3.143
	11.65	0.440	1.995	1.901		-			3.366
3-1/2	9.30	0.254	2.992	2.867	4.250	3.882	8.535	3.775	2.590
	10.30	0.289	2.922	2.797		3.933			2.915
	12.80	0.368	2.764	2.639		4.051			3.621
	12.95	0.375	2.750	2.625		4.059			3.682
	15.10	0.449	2.602	2.477		-			4.304
	15.80	0.476	2.548	2.423		-			4.522
	16.70	0.510	2.480	2.355		-			4.791
	17.05	0.530	2.440	2.315		-			4.945
4	11.00	0.262	3.476	3.351	4.750	4.402	9.118	4.056	3.077
	13.40	0.330	3.340	3.215		4.492			3.805
	19.00	0.500	3.000	2.875		-			5.498
	22.50	0.610	2.780	2.655		-			6.497
4-1/2	12.75	0.271	3.958	3.833	5.200	4.921	9.598	4.306	3.600
	13.50	0.290	3.920	3.795		4.921			3.836
	15.50	0.337	3.826	3.701		4.996			4.407
	19.20	0.430	3.640	3.515		-			5.498
	21.60	0.500	3.500	3.375		-			6.283
	24.00	0.560	3.380	3.255		-			6.932
	26.50	0.630	3.240	3.115		-			7.660

(B) Coupling Critical Area (Sq. in)		Coupling Efficiency (%) B/A x 100		Joint Yield Strength (1,000 lbs)									
				J55	C75	N80 L80 AC80 CR9,13,25 -80 NIC25,32 -80	C90 AC90	C95 AC95 CR9,13 -95	P105	NIC 25 32 42 -110 CR22 -110	NK125 NIC 25 32 42 -125 CR22 -125	NIC 42M -135	NIC 52 -140 CR22 -140
Regular	Special	Regular	Special										
2.365	1.603	181	123	72	98	104	117	124	137	143	163	176	183
	1.603	160	109	81	111	118	133	140	155	162	185	199	207
	1.740	140	103	93	127	135	152	161	178	186	212	228	237
	1.791	136	103	95	130	139	156	165	182	191	217	234	243
	-	110	-	119	162	172	194	204	226	237	269	291	301
3.503	2.025	193	112	100	136	145	163	172	190	199	227	245	254
	2.332	155	103	124	169	180	203	214	237	248	282	304	316
	2.555	141	103	137	186	199	224	236	261	273	311	335	348
	2.781	129	103	149	203	217	244	257	285	298	339	366	379
	-	114	-	168	230	245	275	291	321	336	382	413	428
	-	111	-	173	236	252	283	299	330	346	393	424	440
	-	104	-	185	252	269	303	320	353	370	421	454	471
5.045	2.682	195	104	142	194	207	233	246	272	285	324	350	363
	2.995	173	103	160	219	233	262	277	306	321	364	394	408
	3.735	139	103	199	272	290	326	344	380	398	453	489	507
	3.786	137	103	203	276	295	331	350	387	405	460	497	515
	-	117	-	237	323	344	387	409	452	473	538	581	603
	-	112	-	249	339	362	407	430	475	497	565	610	633
	-	105	-	264	359	383	431	455	503	527	599	647	671
	-	102	-	272	371	396	445	470	519	544	618	668	692
5.808	3.292	189	107	169	231	246	277	292	323	338	385	415	431
	3.920	153	103	209	285	304	342	361	400	419	476	514	533
	-	106	-	302	412	440	495	522	577	605	687	742	770
	-	89	-	319C	436C	465C	523C	552C	610C	639C	726C	784C	813C
6.171	3.954	171	110	198	270	288	324	342	378	396	450	486	504
	-	161	103	211	288	307	345	364	403	422	480	518	537
	4.529	140	103	242	331	353	397	419	463	485	551	595	617
	-	112	-	302	412	440	495	522	577	605	687	742	770
	-	98	-	339C	463C	494C	555C	586C	648C	679C	771C	833C	864C
	-	89	-	339C	463C	494C	555C	586C	648C	679C	771C	833C	864C
	-	81	-	339C	463C	494C	555C	586C	648C	679C	771C	833C	864C

Note: C Critical Member is Coupling Side.

Warren Service Co.

Distributor For Elder Oil Tools

PO BOX 1000 WARREN

OHIO 44024

TELEPHONE 338-1000

DISPOSAL

DATE 2-3-08

WELL NO. 1

LEASE

FIELD

Port Clinton, Ohio

8.08	32.88	33.18	33.15	33.21	30.65	30.67	30.87
32.83	33.16	33.13	33.14	30.65	31.03	30.98	
32.94	28.58	33.05	33.12	30.82	30.92	30.91	
32.90	33.18	33.14	33.16	30.87	30.89	31.09	
32.11	33.15	33.17	33.12	30.42	31.09	30.72	
32.99	31.16	32.98	33.17	30.52	31.04	30.71	
32.96	33.16	33.12	33.15	30.82	31.02	30.88	
31.99	33.19	33.14	33.14	31.00	30.90	31.05	
32.93	33.09	33.05	33.05	30.67	31.01	30.95	
32.92	33.01	33.12	33.14	30.94	30.92	30.67	
32.97	33.11	33.00	32.95	31.00	30.92	31.00	
32.81	33.21	33.20	33.11	30.80	30.69	30.74	
33.03	32.14	33.15	33.03	30.64	30.83	30.88	
32.98	32.33	32.17	33.17	30.90	30.88	29.87	
32.96	33.16	33.02	33.14	30.63	31.10	30.15	
33.08	33.10	33.07	33.14	30.69	31.20	30.72	
33.07	31.07	33.11	33.17	30.64	31.25	30.40	
33.07	33.11	33.00	31.40	30.86	31.02	30.80	
33.13	29.12	33.25	30.91	30.65	31.04	30.09	
33.10	33.14	33.05	30.74	30.45	31.21	30.69	
665.77	645.24	661.10	656.16	614.62	619.61	615.11	140.00

141 30.76 143 30.69 145 30.90 147 31.10

142 30.94 144 31.09 146 30.95

216.43

TOTAL T.B. + PKT. 4697.04 + 10' zero = 4707.04

TUBING SIZE AND CAPACITY

OD	WEIGHT	ID	BBL/FT
1.900	2.90	1.510	.0025
2.375	4.70	1.990	.0039
2.875	6.40	2.440	.0058
2.875	6.50	2.250	.0050
3.500	7.30	2.990	.0087
3.500	10.20	2.920	.0083
3.500	11.90	2.750	.0074
3.500	13.50	3.540	.0122
4.500	17.70	3.950	.0152

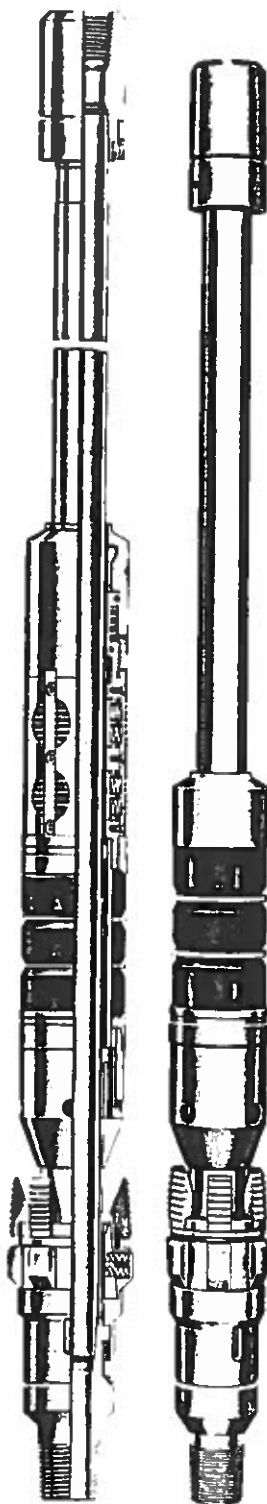
CASING SIZE AND CAPACITY

OD	WEIGHT	ID	BBL/FT
4-1/2	9.50	3.990	.0162
4-1/2	10.50	3.952	.0159
4-1/2	13.50	3.920	.0149
5-1/2	14.00	4.012	.0241
5-1/2	15.50	4.050	.0231
5-1/2	17.00	4.090	.0232
5-1/2	20.00	4.178	.0222
7	17.00	4.530	.0413
7	20.00	4.580	.0403
7	23.00	4.620	.0393

EXHIBIT L-5

INJECTION PACKER DATA

RETRIEVABLE PACKER SYSTEMS



Model "R-3" Double-Grip, (left)
and Single-Grip (right)
Retrieval Casing Packers

MODEL "R-3"™ DOUBLE-GRIP RETRIEVABLE CASING PACKER Product No. 642-01

The "R-3 Double-Grip" is a truly versatile set-down type packer. Proven by its world-wide use, it performs reliably in production, stimulation and testing operations.

FEATURES/BENEFITS

- Hydraulic button-type hold down located below the bypass valve.
- Unique, built-in, "differential lock" helps keep the bypass valve closed.
- Effective bypass design speeds equalization and resists swab-off.
- Field-proven, three-element packing system and rocker-type slips.

MODEL "R-3" SINGLE-GRIP RETRIEVABLE CASING PACKER Product No. 641-01

In wells where excessive bottom-hole pressure is not expected, the "Single-Grip R-3" is the answer to your needs for a set-down, retrievable packer. From the packing elements down, the "R-3 Single-Grip" is identical to the Double-Grip Model. Running, setting and releasing procedures are the same for both packers.

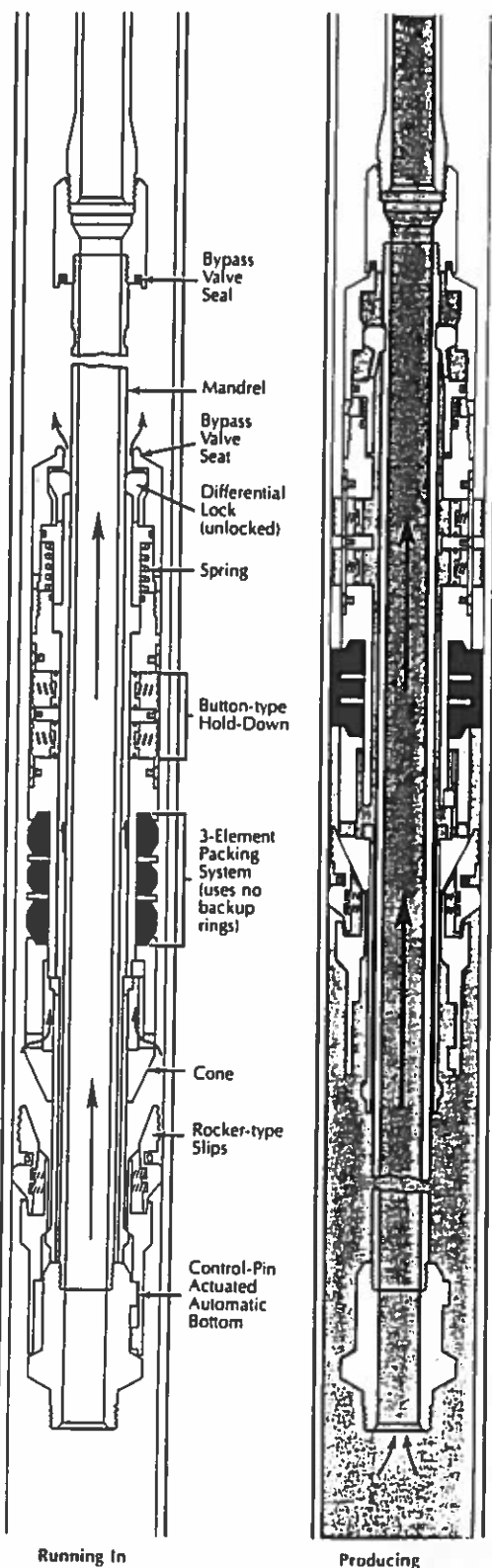
TO SET THE PACKER: The "R-3" is set by picking up, rotating to the right and then slacking off on the tubing. Set-down weight closes and seals the bypass valve, sets the slips and packs-off the packing elements.

TO RELEASE THE PACKER: Picking up the tubing releases the packer (no rotation required). When the tubing is raised, the bypass valve opens to permit circulation through and around the packer. When the tubing string is raised the full length of the packer, the J-pins (on the bottom sub) are oriented for automatic re-engagement. By then lowering the tubing slightly, the J-pin engages the J-slot thus assuring complete release and preventing accidental resetting while retrieving the packer.

ORDERING EXAMPLE:

PRODUCT NO. 642-01
SIZE: 4784 (7" OD 20-26 lb/ft casing)
MODEL "R-3" DOUBLE-GRIP RETRIEVABLE CASING PACKER
w/2-7/8" OD EU B RD Box x Pin, for 1-53, 6.5 lb/ft tubing

MODEL "R-3" DOUBLE-GRIP PACKER OPERATION



RETRIEVABLE PACKER SYSTEMS

MODEL "R-3" DOUBLE-GRIP AND SINGLE-GRIP RETRIEVABLE CASING PACKER PROD. NOS. 642-01, 641-01 SPECIFICATION GUIDE

Casing				Packer				Casing				Packer			
OD	Weight ¹¹	ID Range In Which Packer May Be Run	Thread Specification ¹²	Mem ID	Slit ¹³	Min	Max	Weight ¹¹	ID Range In Which Packer May Be Run	Thread Specification ¹²	Mem ID	Slit ¹³	Min	Max	Thread Specification ¹²
In. mm	Lb/M	In. mm	Box Up & Pin Down	In. mm	In. mm	In. mm	In. mm	Lb/M	In. mm	Box Up & Pin Down	In. mm	In. mm	In. mm	In. mm	Box Up & Pin Down
2-7/8 73.02	6.4-6.5	2.347 59.62	2.441 62.00	2.234 56.74	28A 28A ¹⁴ Hi-Temp	1.75 44.65	1.95 49.78	24-28	5.791 147.1	5.921 150.4	4.5EF	45EF	5.791 147.1	5.921 150.4	2-3/8 OD EU 8 RD 60.33
3-1/2 88.90	4.7-5.6	2.442 62.03	2.563 65.19	2.357 59.87	28B	1.95 49.78	2.15 54.91	24	5.830 148.1	5.937 150.8	46A4	47A2	5.830 148.1	5.937 150.8	2-7/8 OD EU 8 RD 73.02
4	10.2	2.834 71.98	2.922 74.22	2.782 70.66	35A	1.38 35.05	1.58 40.13	17-20	5.938 150.8	6.094 154.8	47A4	47A4	5.938 150.8	6.094 154.8	3-1/2 OD EU 8 RD 80.90
5	15-18	3.428 87.07	3.548 90.12	3.393 86.90	41A	1.50 38.10	1.70 43.18	30	5.791 147.1	5.921 150.4	46A4	47A2	5.791 147.1	5.921 150.4	2-7/8 OD EU 8 RD 73.02
5-1/2 139.70	11.5-15	3.754 95.35	3.826 97.16	3.620 92.05	41B	1.50 38.10	1.70 43.18	32-35	5.938 150.8	6.094 154.8	47A4	47A2	5.938 150.8	6.094 154.8	3-1/2 OD EU 8 RD 80.90
6	20-23	4.250 95.35	4.408 110.0	4.125 104.78	43A	1.89 48.01	2.09 53.11	28-29	6.136 155.8	6.276 159.4	47A4	47A2	6.136 155.8	6.276 159.4	2-7/8 OD EU 8 RD 73.02
6-5/8 168.28	15.5-20	4.778 107.9	4.950 121.4	4.641 118.39	45A2	2.38 60.45	2.58 65.53	20-26	6.276 159.4	6.456 164.0	47A4	47A2	6.276 159.4	6.456 164.0	3-1/2 OD EU 8 RD 80.90
7	17-20	5.190 125.7	5.391 131.8	5.062 128.57	45A4	2.58 65.53	2.78 70.61	17-20	6.456 164.0	6.576 167.1	47A4	47A2	6.456 164.0	6.576 167.1	2-7/8 OD EU 8 RD 73.02
7-5/8 193.64	13-15.5	4.893 124.3	5.044 128.1	4.701 121.44	45B	2.38 60.45	2.58 65.53	33.7-39	6.576 167.1	6.756 171.8	47C4	47C2	6.576 167.1	6.756 171.8	3-1/2 OD EU 8 RD 80.90
8	20-23	5.190 125.7	5.391 131.8	5.062 128.57	45B	2.38 60.45	2.58 65.53	24-28.7	6.756 171.8	6.876 174.9	47C4	47C2	6.756 171.8	6.876 174.9	2-7/8 OD EU 8 RD 73.02
8-5/8 219.08	15-18	5.561 136.9	5.699 142.5	5.406 137.31	45C	2.58 65.53	2.78 70.61	28-24	6.876 174.9	7.056 179.4	47C4	47C2	6.876 174.9	7.056 179.4	3-1/2 OD EU 8 RD 80.90
9-5/8 244.48	34	5.610 142.5	5.791 147.1	5.484 139.29	45E2	2.41 61.21	2.61 66.29	44-49	7.056 179.4	7.236 184.0	47D4	47D4	7.056 179.4	7.236 184.0	2-7/8 OD EU 8 RD 73.02
	28-32	5.600 142.2	5.791 147.1	5.484 139.29	45E4	2.41 61.21	2.61 66.29	32-48	7.236 184.0	7.416 188.0	47D4	47D4	7.236 184.0	7.416 188.0	3-1/2 OD EU 8 RD 80.90
		5.600 142.2	5.791 147.1	5.484 139.29	46A2	2.41 61.21	2.61 66.29	20-28	7.416 188.0	7.596 192.0	47D4	47D4	7.416 188.0	7.596 192.0	2-7/8 OD EU 8 RD 73.02

¹¹ When selecting a packer for a casing weight common to two weight ranges (casing OD, choose the packer size shown for the lighter of the two weight ranges. Example: For 7-20 lb/ft casing use packer size 47C2. Under certain circumstances the other packer size may be run, such as when running in mixed casing strings.

¹² Sizes 28, 32, 41 are available in this model as single-grip packers, Prod. No. 641-01. For double-grip version, contact your Baker Representative about the Model "R-3" Hydra-Grip Commander, Prod. No. 487-20.

¹³ Threads shown below are "standard" for the respective packer sizes. Other threads are available on request. Please specify threads when ordering.

¹⁴ For use when anticipated conditions exceed 200°F (93.3°C) or 3800 PSI (261.167 kg/cm²) differential across tool.

Repair kits, including such items as packing elements, seal rings, etc. are available for redressing Baker retrievable packers. Contact your Baker Representative. Use only Baker repair parts.

EXHIBIT L-6

**CASING CEMENTING JOB DATA AND
U.S. EPA INSPECTOR'S REPORTS
(CONDUCTOR PIPE, SURFACE CASING, LONG STRING AND LINER)**

CEMENTING TICKET

2478

ROBINSON ENGINEERING

Oilwell Cementing Division

P.O. Box 5269, Evansville, Indiana 47716-5269

(812) 477-1575

Date 3-11-71 Field MORGANTOWN Order No. #1Well No. #1 Farm TRACO County BUTLER State KYTO: TRACO RECYCLING INC. Owner of Well TRACO

Mail Address _____

City MORGANTOWN State KENTUCKY Contractor IND DRILLDepth of Well 43' Depth of Casing 38' Casing { New } Size 1 5/8" Size of Hole 1 7/8"
{ Used } Weight _____Kind of Job CONCRETE Press: { Circulating _____ Cement left _____ Request _____
Maximum _____ in Pipe by _____ Necessity _____ Feet

	Unit Price	Price
Pump Truck <u>RIG UP</u>	<u>350</u>	<u>350</u>
<u>80 miles @ 2.2¢/mile</u>	<u>2</u>	<u>176</u>
Cement <u>100 SK CLASS A</u>	<u>5</u>	<u>500</u>
<u>Two miles (100 SK) (44¢/SK) (21000) (20 mile)</u>	<u>.65</u>	<u>244</u>
Additives <u>2 SK Calcium Chloride</u>	<u>25</u>	<u>50</u>
Plugs <u>NONE</u>		
Other <u>CEMENT CIRCULATED TO SURFACE</u>		
TOTAL		<u>1150</u>

As a part of the consideration of, it is agreed that Oil Well Cementing shall not be liable or responsible for any loss, damage or injury to said well resulting from the use of such cementing equipment, or for the acts of any person engaged in doing such work on the above described well. The above job was done under the supervision of the owner, operator, or his agent whose signature appears below:

Cementer BARRY SCHROEDER

Agent of Contractor or Operator

Helper STUCK KIRKLEY

Robert W. Nitsan
Signature
ROBERT NITSAN
Print Name

CEMENTING TICKET

2477

ROBINSON ENGINEERING

Oilwell Cementing Division

P.O. Box 5269, Evansville, Indiana 47716-5269

(812) 477-1575

Date 3-12-91 Field MORGANTOWN Order No. #2
 Well No. #1 Farm IMCO County BUTLER State KY
 CHARGE TO: IMCO RECYCLING Owner of Well IMCO
 Mail Address _____
 City MORGANTOWN State KENTUCKY Contractor IMCO DILL

Depth of Well 470' Depth of Casing 465' Casing { New } Size 7 1/2" Size of Hole 11 1/4"
 { Used } Weight 36 LB/FT
 Kind of Job SURFACE Press: { Circulating _____ Cement left in Pipe by _____ } Request Necessity 20' Feet
 { Maximum _____ }

	Unit Price	Price
Pump Truck <u>RIG-UP</u>	<u>350</u>	<u>350</u>
<u>2 1/2" x 11 1/4" x 11 1/4"</u>	<u>2</u>	<u>176</u>
Cement <u>500 SK CLASS A</u>	<u>5</u>	<u>1500</u>
<u>7 1/2" x 11 1/4" x 11 1/4" (3025) (14 1/2" x 80) (14 1/2" x 80)</u>	<u>1.65</u>	<u>733</u>
Additives <u>2 SK Calcium Silicate</u>	<u>25</u>	<u>125</u>
Plugs <u>NONE</u>		
Other <u>3 - 9 1/2" x 11 1/4" x 11 1/4" CENTRALIZERS</u>	<u>64</u>	<u>192</u>
<u>CEMENT CIRCULATED TO THE SURFACE</u>		
TOTAL		3051

As a part of the consideration of, it is agreed that Oil Well Cementing shall not be liable or responsible for any loss, damage or injury to said well resulting from the use of such cementing equipment, or for the acts of any person engaged in doing such work on the above described well. The above job was done under the supervision of the owner, operator, or his agent whose signature appears below:

Cementer BARRY SCHNEIDER Agent of Contractor or Operator I. L. T.
 Helper FRANK WILLY Signature _____
 Print Name _____



McCoy & McCoy ENVIRONMENTAL CONSULTANTS, INC.
A SUBSIDIARY OF MCCOY & MCCOY, INC.

UIC MECHANICAL INTEGRITY TEST



Region IV Water Supply Branch
345 Courtland St. NE
Atlanta, Georgia 30385
Phone (404)347-3888

WELL IDENTIFICATION

OPERATOR IMCO Recycling, Inc. EPA KYS NO. KYT 0429
ADDRESS 1503-1511 North 8TH St. LEASE NAME IMCO Well #1
Sapulpa, OK 74066 WELL NO. _____
PHONE # (918) STATE PERMIT NO. 81179 POOL _____
2340 PS: 160 FEET: 14 I 34 STATE NAME/CODE KY/21 TN/47 (circle one)
COUNTY Butler COUNTY CODE 031

WELL COMPLETION

WELL TYPE (code) I TOTAL DEPTH _____ (ft) SURFACE ELEVATION 445.6 (ft MSL)

CASING STRING	CASING DIAMETER (inches)	CEMENT SHOE DEPTH	CEMENT VOLUME (sacks/type)	PACKER TYPE	PACKER DEPTH
Surface	<u>9 5/8"</u>	<u>466</u>	<u>300 sks</u>		
Intermediate					
Production					
Tubing					

MAX. INJECTING PRES. _____ (psi)
EST. FRACTURE PRES. _____ (psi)
PERFORATIONS @ _____ (ft)

CONFINING FORMATION NAME _____ LOWERMOST USDW FORMATION NAME _____
TOP ELEVATION _____ (MSL) BASE ELEVATION _____ (MSL)
THICKNESS _____ (ft) INJECTION FORMATION TOP ELEVATION _____ (MSL)

MIT TEST DATA

TEST DATE 8/12/91 INJECTED FLUID _____ Sg _____
EXTERNAL MIT: CEMENT RECORD ☐ LOGS ☐ ANNULAR FLUID _____ Sg _____
TYPE OF TEST SHUT-IN ☐ INJECTING ☐ (check one) INJECTION RATE _____ (bbl/day)
INJECTION PRESSURE _____ (psi)

ANNULAR PRESSURE TEST

INITIAL TEST PRESSURE (psi) _____ FINAL TEST PRESSURE (psi) _____ PRESSURE CHANGE (-/+ psi) _____ LENGTH OF TEST (MINUTES) _____
ANNULAR SPACE _____

COMMENTS

NEW WELL CONSTRUCTION.
Witness cementing of surface casing only
9 5/8" TOC @ surface
Work done by Robinson Engineering

OPERATOR
REPRESENTATIVE

Irvin Tamm

UIC INSPECTOR

David M. Oldham

U.S. ENVIRONMENTAL PROTECTION AGENCY

Notice of Inspection

ADDRESS (EPA Regional Office)

Environmental Protection Agency
Region IV, Ground Water Protection Branch
345 Courtland St. NE
Atlanta, Georgia 30365
404-347-3886

INSPECTION CONTRACTOR

McCoy & McCoy, Inc.
P.O. Box 11279
Lexington, Kentucky 40574
806-233-7774

FIRM TO BE INSPECTED

IMCO Recycling, Inc.
1503-1511 North 8th St.
Sapulpa, OK 74066

DATE 8/12/91**HOUR**

This document constitutes written notice pursuant to 42 U.S.C. § 300j-4 (b)(1) of inspection by duly authorized personnel of the U.S. Environmental Protection Agency of this facility noted below.

REASON FOR INSPECTION *New Well Construction*

The purpose of inspection is to determine whether the person (including any corporation or partnership) subject to any applicable underground injection control program has acted or is acting in compliance with The Safe Drinking Water Act and all regulations promulgated thereunder, including underground injection control (UIC) regulations and any applicable permit or rule.

IMCO well #1 KYI0429

Ran 471' of 9⁵/₈" casing, 36 lbs/ft., to 466' below ground level and circulated 300 sks A' cement w/ 4% CaCl followed by 34 bbls water.

Section 1445(b) of the SDWA (42 U.S.C. § 300j-4 (b)) is quoted on the reverse of this form.

Receipt of this Notice of Inspection is hereby acknowledged.

FIRM REPRESENTATIVE*John Tamen***DATE***8/12/91***INSPECTOR**

(McCoy & McCoy)

David M. O'Han

CEMENTING SERVICE REPORT



DOWELL SCHLUMBERGER INCORPORATED

DS-496 PRINTED IN U.S.A.

TREATMENT NUMBER		DATE
STAGE	DS	DISTRICT

WELL NAME AND NO		LOCATION (LEGAL)		RIG NAME	
OLD POOL		FORMATION		WELL DATA	
COUNTY/PARISH		STATE	API NO	BOTTOM	
NAME		AND		TOTAL	
ADDRESS		ZIP CODE		MUD TYPE	
SPECIAL INSTRUCTIONS		MUD DENSITY		MUD VISC	
IS CASING/TUBING SECURED? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		LIFT PRESSURE		PRESSURE LIMIT	
LIFT PRESSURE		PSI		CASING WEIGHT - SURFACE AREA	
PRESSURE LIMIT		PSI		BUMP PLUG TO	
ROTATE		RPM		RECIPROCATATE	
FT		No of Centralizers		15	
TIME		PRESSURE		VOLUME PUMPED BBL	
0001 to 2400		TBG OR O.P.		CUM	
INJECT RATE		FLUID TYPE		FLUID DENSITY	
ARRIVE ON LOCATION		DATE		LEFT LOCATION	
TIME		DATE		DATE	
SERVICE LOG DETAIL		PRE-JOB SAFETY MEETING		SQUEEZE JOB	
Head & Plugs		TBG		D.P.	
Double		SIZE		TOOL	
Single		WEIGHT		DEPTH	
Swage		GRADE		TAIL PIPE SIZE	
Knockoff		THREAD		DEPTH	
TOP OR CW		NEW OR USED		TUBING VOLUME	
BOT OR CW		DEPTH		CASING VOL BELOW TOOL	
TOTAL		ANNUAL VOLUME		Bbls	

TIME	PRESSURE	VOLUME PUMPED BBL	JOB SCHEDULED FOR TIME	DATE	ARRIVE ON LOCATION TIME	DATE	LEFT LOCATION TIME	DATE
0001 to 2400	TBG OR O.P.	CUM	INJECT RATE	FLUID TYPE	FLUID DENSITY	SERVICE LOG DETAIL		
						PRE-JOB SAFETY MEETING		
						Handwritten notes and data entries follow in this section.		

REMARKS

SYSTEM CODE	NO OF SACKS	YIELD CU FT/SK	COMPOSITION OF CEMENTING SYSTEMS				SLURRY MIXED	
1							BBLs	DENSITY
2								
3								
4								
5								
6								
BREAKDOWN FLUID TYPE			VOLUME			DENSITY		
HESITATION SO			CIRCULATION LOST			PRESSURE		
PSI			PSI			MAX MIN		
Washed Thru Parts			MEASURED DISPLACEMENT			Cement Circulated To Surf		
YES NO TO			FT			YES NO		
PERFORATIONS			CUSTOMER REPRESENTATIVE			DS SUPERVISOR		
TO			TO			TO		

DOWELL SCHLUMBERGER INCORPORATED

P.O. BOX 4378 HOUSTON, TEXAS 77210

CUSTOMER

OILFIELD SERVICES
INDUSTRIAL SERVICES



DSI SERVICE ORDER
RECEIPT AND INVOICE NO.

DSI SERVICE LOCATION NAME AND NUMBER

CUSTOMER NUMBER

CUSTOMER P.O. NUMBER

TYPE SERVICE CODE

BUSINESS CODES

CUSTOMER'S
NAME

ADDRESS

CITY STATE AND
ZIP CODE

WORKOVER
NEW WELL
OTHER

☐ W
☐ N

API OR IC NUMBER

SEE OTHER SIDE FOR TERMS & CONDITIONS

ARRIVE LOCATION MO. DAY YR. TIME

SERVICE ORDER RECEIPT

I certify that the materials and services listed were authorized and received and all services performed in a workmanlike manner and that I have the authority to accept and execute this document.

JOB COMPLETION MO. DAY YR. TIME

SIGNATURE OF CUSTOMER OR AUTHORIZED REPRESENTATIVE

STATE

CODE

COUNTY / PARISH

CODE

CITY

WELL NAME AND NUMBER / JOB SITE

LOCATION AND POOL / PLANT ADDRESS

SHIPPED VIA

ITEM PRICE REF NO	MATERIAL EQUIPMENT AND SERVICES USED	UNIT	QUANTITY	UNIT PRICE	\$ AMOUNT
051001-001	Hydro pump out	hr	90	2.85	256.50
051002-001	Prop. Unit	ea	1	100.00	100.00
051003-001	Truck Charge	hr	5.12	1.15	5.88
051004-001	Truck	hr	2.103	6.60	13.87
051005-001	Steel Plate in Pile Driver	hr	1	7.00	7.00
051006-001	Concrete Head	ea	1	30.00	30.00
051007-001	7" Top Plug	ea	1	30.00	30.00
051008-001	7" Collar Plug	ea	15	2.50	37.50
051009-001	7" Collar Plug	ea	1	65.00	65.00
051010-001	7" Plastic Bucket	ea	2	175.00	350.00
051011-001	7" Buck with Shoe	ea	1	2000.00	2000.00
051012-001	200' Pipe & Cement	hr	1.37	57.75	79.13
051013-001	DSI Consulting Agent	hr	900	0.53	477.00
051014-001	API, Provisional Certificate	hr	600	0.35	210.00
051015-001	DSI, Fuel loss agent	hr	250	0.40	100.00
051016-001	2nd, 1st form agent	hr	30	3.50	105.00
051017-001	API, Public	hr	2000	0.10	200.00
051018-001	DSI, Collapsing Plug	hr	112	1.15	128.80
051019-001	DSI, Chemical Agent	hr	10	33.00	330.00
051020-001	50' Collapsing Plug	hr	300	0.30	90.00
051021-001	2nd, 1st form agent	hr	420	2.30	966.00
051022-001	DSI, Chemical Agent	hr	10	24.70	247.00
Total to Date Using Dowell Schlumberger!					

SUB TOTAL

LICENSE/REIMBURSEMENT FEE

LICENSE/REIMBURSEMENT FEE

MARKS

STATE

TAX ON \$

COUNTY

TAX ON \$

CITY

TAX ON \$

SIGNATURE OF DSI REPRESENTATIVE

TOTAL \$



McCoy & McCoy Environmental Consultants, Inc.
A Subsidiary of McCoy & McCoy, Inc.

UIC MECHANICAL INTEGRITY TEST



Region IV Water Supply Branch
345 Courtland St. NE
Atlanta, Georgia 30385
Phone (404)347-3886

WELL IDENTIFICATION

OPERATOR IMCO Recycling, Inc.

EPA KYS NO. KYI0429

ADDRESS 1503-1511 North 8th St.

LEASE NAME
WELL NO. IMCO Well #1

Sapulpa, OK 74066

PHONE (918) 665-6575

STATE PERMIT NO. 21179 POOL _____

2340 PM 160 PM 14 I 34

STATE NAME/CODE (KY/21) TN/47 (circle one)
COUNTY NAME Butler COUNTY CODE 031

WELL COMPLETION

WELL TYPE (code) I

TOTAL DEPTH 3998 (ft)

SURFACE ELEVATION 445.6 (ft MSL)

CASING
STRING

CASING
DIAMETER
(Inches)

CEMENT
SHOE
DEPTH

CEMENT
VOLUME
(sacks/type)

PACKER TYPE _____

PACKER DEPTH _____ (ft)

Surface
Intermediate
Production
Tubing

9 5/8"
7"

466
2542

300 sks / ft
450 sks / ft

MAX. INJECTING PRES. _____ (psi)

EST. FRACTURE PRES. _____ (psi)

PERFORATIONS @ _____ (ft)

CONFINING
FORMATION

NAME _____

TOP ELEVATION _____ (MSL)

THICKNESS _____ (ft)

LOWERMOST
USOW

FORMATION NAME _____

BASE ELEVATION _____ (MSL)

INJECTION
FORMATION

FORMATION NAME _____

TOP ELEVATION _____ (MSL)

MIT TEST DATA

TEST DATE 8/21/91

INJECTED FLUID _____ Sg _____

EXTERNAL MIT. CEMENT RECORD ☐

LOGS ☐

ANNULAR FLUID _____ Sg _____

TYPE OF TEST

SHUT-IN ☐

INJECTING ☐

(check one)

INJECTION RATE _____ (bbl/day)

INJECTION PRESSURE _____ (psi)

ANNULAR PRESSURE TEST

INITIAL TEST PRESSURE
(psi)

FINAL TEST PRESSURE
(psi)

PRESSURE CHANGE
(-/+ psi)

LENGTH OF TEST
(MINUTES)

ANNULAR SPACE _____

COMMENTS

New Well Construction. Witness cementing of 7" long string
7" casing: K55, 23 lbs/ft @ 9.55/ft, ≈ 45' joints, bottom 7 joints were
sandblasted, 3 cement baskets on end, 15 centralizers.

Cement work by Dowell-Schlumberger out of Mt. Carmi, IL. Slurry: 14.8 lbs/gal
7" cement circulated to surface w/ 450 sks followed by 99 bbls
water.

OPERATOR
REPRESENTATIVE J. [Signature]

UIC INSPECTOR David M. Williams

hm

U.S. ENVIRONMENTAL PROTECTION AGENCY

Notice of Inspection

ADDRESS (EPA Regional Office) Environmental Protection Agency Region IV, Ground Water Protection Branch 345 Courtland St. NE Atlanta, Georgia 30385 404-347-3868	INSPECTION CONTRACTOR McCoy & McCoy, Inc. P.O. Box 11279 Lexington, Kentucky 40574 606-233-7774	FIRM TO BE INSPECTED <i>IMCO Recycling, Inc</i>
---	---	--

DATE <i>8/21/91</i>	This document constitutes written notice pursuant to 42 U.S.C. § 300j-4 (b)(1) of inspection by duly authorized personnel of the U.S. Environmental Protection Agency of this facility noted below.
HOUR <i>1:30 am</i> ^{<i>8/22/91</i>}	

REASON FOR INSPECTION

The purpose of inspection is to determine whether the person (including any corporation or partnership) subject to any applicable underground injection control program has acted or is acting in compliance with The Safe Drinking Water Act and all regulations promulgated thereunder, including underground injection control (UIC) regulations and any applicable permit or rule.

IMCO Well #1 KYI 0429

Ran 7" to 2542' (base of shale), circulated 450 sks to surface

Section 1445(b) of the SDWA (42 U.S.C. § 300j-4 (b)) is quoted on the reverse of this form.

Receipt of this Notice of Inspection is hereby acknowledged.

FIRM REPRESENTATIVE <i>T. J. Turner</i>	DATE <i>8/21/91</i>	INSPECTOR (McCoy & McCoy) <i>David M. O'Brien</i>
--	------------------------	--

DOWELL SCHLUMBERGER INCORPORATED

P.O. BOX 4378 HOUSTON, TEXAS 77210

CUSTOMER

DSI SERVICE ORDER
RECEIPT AND INVOICE NO.

DSI SERVICE LOCATION NAME AND NUMBER

M. C. ...

CUSTOMER NUMBER

CUSTOMER P.O. NUMBER

TYPE SERVICE CODE

BUSINESS CODES

CUSTOMER'S
NAME

ADDRESS

CITY, STATE AND
ZIP CODE

DSI will furnish and Customer shall purchase materials and services required in the performance of the following SERVICE INSTRUCTIONS or DSI INDUSTRIAL SERVICE CONTRACT NO. _____ in accordance with the terms and conditions as printed on the reverse side of this form.

...

...

...

WORKOVER
NEW WELL
OTHER

W
N

API OR IC NUMBER

IMPORTANT
SEE OTHER SIDE FOR TERMS & CONDITIONS

ARRIVE LOCATION MO. DAY YR. TIME

SERVICE ORDER RECEIPT

I certify that the materials and services listed were authorized and received and all services performed in a workmanlike manner and that I have the authority to accept and execute this document.

JOB COMPLETION MO. DAY YR. TIME

SIGNATURE OF CUSTOMER OR AUTHORIZED REPRESENTATIVE

STATE CODE COUNTY / PARISH CODE CITY

WELL NAME AND NUMBER / JOB SITE

LOCATION AND POOL / PLANT ADDRESS

SHIPPED VIA

ITEM/PRICE REF. NO.	MATERIAL, EQUIPMENT AND SERVICES USED	UNIT	QUANTITY	UNIT PRICE	\$ AMOUNT
287100-000	Mixing	2	90	2.65	278.50
100000-000	Pump	1	1	1400.00	1400.00
150000-000	...	2	1	135.00	135.00
170000-000	...	CF	667	1.15	767.00
040100-000	...	7M	2882	.84	2420.00
040001-000	...	CF	650	5.75	3737.50
045000-000	D 53	105	1300	.33	429.00
050000-000	...	105	1100	.26	286.00
040000-000	...	105	364	6.00	2160.00
047000-000	...	105	122	2.81	342.82
100000-000	...	801	10	33.25	332.50
000000-000	...	101	420	2.30	966.00
050000-000	...	EA	22	50.00	1100.00
045000-000	...	105	122	1.12	136.64
050000-000	...	EA	1	1985.00	1985.00
040000-000	...	HR	40	47.50	1900.00
040000-000	...	HR	50	135.00	6750.00

SUB TOTAL

LICENSE/REIMBURSEMENT FEE

LICENSE/REIMBURSEMENT FEE

MARKS

STATE

% TAX ON \$

COUNTY

% TAX ON \$

CITY

% TAX ON \$

SIGNATURE OF DSI REPRESENTATIVE

TOTAL \$



CamCADE™ Version 2.501
Well Cementing Recommendations

Client
Casing
Well
Field
County
State
Rig Name

IMCO ALUMINUM
4 1/2 LINER
DISPOSAL WELL
MORGANTOWN
BUTLER
KENTUCKY
INDIANA DRILL

WELL Description

Job Type : Primary
Rig Type : OnShore
Fluid Returns at : 0.0 ft
Surface Temperature : 32.0 deg.F
Landing Collar MD : 4700.0 ft
Casing Shoe MD : 4700.0 ft
DHST : 100.0 deg.F
Bit Size : 7 in

PREVIOUS CASING

MD (ft)	OD (in)	Weight (lb/ft)	ID (in)
2542.0	7	23.600	6.37

CASING

MD (ft)	OD (in)	Weight (lb/ft)	ID (in)	Pressure (psi)	
				Collapse	Burst
4700.0	4 1/2	10.500	4.95	4010	4700

FORMATIONS and SAFETY CHECKS

MD (ft)	Pressure (psi)		Formation Name	Lithol. code	Fluid code
	Fracture	Pore			
4700.0	6765	1175	OPEN HOLE		

CALIPER and HOLE SIZE DATA

MD (ft)	Caliper 1 (in)	Caliper 2 (in)	OH Volume (bbl)	Annular Excess (%)	Equiv. Diam. (in)
4700.0	7 7/8	7 7/8	130.01		7 7/8

Kick-off Point Depth : 0.0 ft

SURVEY DATA

MD (ft)	Inc (deg)	DLŚ (G/100ft)	TVD (ft)
4700.0	0.0	0.00	4700.0



CEMENTADE™ Version 2.0.0
Well Cementing Recommendation

Client
Casing
Well
Field
County
State
Reg Name

IMCO ALUMINUM
4 1/2 LINER
DISPOSAL WELL
MORGANTOWN
BUTLER
KENTUCKY
INDIANA DRILL

FILL Description

Fluid in Order Pumped	Volume (bbl)	Depth (ft)		Fill (ft)
		Top	Bottom	
Annulus (Top to Bottom)				
WATER	69.91	Surface	3031.0	3031.0
WATER	5.00	3031.0	3154.3	123.2
CW100 Wash	10.00	3154.3	3400.7	246.5
WATER	10.00	3400.7	3647.2	246.5
ZONFLOCK	10.00	3647.2	3893.7	246.5
WATER	10.00	3893.7	4140.2	246.5
CLS A KCL	22.71	4140.2	4700.0	559.8
Casing (Bottom to Top)				
Casing Shoe		4700.0		
Landing Collar		4700.0		
WATER	50.63	Surface	4700.0	3174.7

Top of Cement (design) : 4140.2 ft
Top of Tail Slurry : 4140.2 ft

Cement Quantities

CLS A KCL : 93.0 sacks



PERCADE TM Version 2.73.1
Well Cementing Recommendation

Client
Casing
Well
Field
County
State
Rig Name

IMCO ALUMINUM
1 1/2 LINER
DISPOSAL WELL
MORGANTOWN
BUTLER
KENTUCKY
INDIANA DRGL

PUMPING SCHEDULE

Fluid Pumped	Pump Rate bbl/min	Fluid Volume bbl	Stage Time minutes	Elapsed Time minutes	Comments
START JOB:					CEMENT 1 1/2 LINER
WATER	4.00	5.00	1:15	1:15	
CW100 Wash	4.00	10.00	2:30	3:45	
WATER	4.00	10.00	2:30	6:15	
ZONELOCK	4.00	10.00	2:30	8:45	
WATER	2.00	10.00	5:00	13:45	
CLS A KCL	5.00	22.71	4:32	18:17	
WATER	3.00	50.63	10:52	35:19	
END JOB:					FLOW BACK-FLOAT HOLDING

PA MicroVAX V2.0
27-NOV-91 13:54

Dove Schlumberger



PACR PRINT

IMCO ALUMINUM
DISPOSAL WELL
ROBINSON
MORGANTOWN

MT. CARMEL ILL.
CEMENT 4 1/2 LINER
01-03-7030
11-27-91

TIME	PRESSURE W.H. PRESS PSI	DENSITY OI DENSITY PPG	FLOW RATE UI FLOW BPM	EVENTS
HH:MM:SS				
19:58:28	0	5.0	0.0	START JOB
02:54:28	0	5.0	0.0	
02:55:00	0	5.0	0.0	
02:55:04				
02:56:00	1	7.5	0.0	START PUMPING WATER
02:57:00	214	7.0	1.7	
02:57:00				SET PACKER
02:57:00				START PUMPING WASH RESET VOLUME
02:58:00	542	7.6	4.9	
02:58:04				
02:58:16				
02:58:30	520	7.5	4.9	
02:59:00	555	7.3	5.9	
03:00:00				
03:00:00	394	7.3	5.7	START PUMPING WATER
03:01:00	422	7.3	4.2	
03:01:00	431	7.8	4.2	START ZONELOCK START PUMPING FLUID 1
03:03:00				
03:03:00	510	7.9	4.6	
03:03:00	496	7.3	4.5	
03:03:00				
03:03:00				
03:03:00	482	7.8	4.7	START PUMPING WATER
03:07:00	112	7.6	3.2	
03:08:00	154	7.6	2.4	
03:09:00	163	8.5	2.6	
03:09:00				START CEMENT SLURRY

PACR MicroVAX V2.0
27-NOV-91 13:54

Dowell Schlumberger



PACR PRINT

IMCO ALUMINUM
DISPCSAL. WELL
ROBINSON
MORGANTOWN

MT. CARMEL ILL.
CEMENT 4 1/2 LINER
01-03-7030
11-27-91

TIME	PRESSURE	DENSITY	FLOW RATE	EVENTS
HH:MM:SS	W.H. PRESS PSI	UI DENSITY PPG	UI FLOW BPM	
03:10:00	473	15.2	4.4	
03:11:00	394	14.8	4.7	
03:12:00	329	14.8	5.0	
03:13:00	279	14.7	5.1	
03:14:00	273	14.5	5.2	
03:15:00	191	15.0	5.3	
03:16:00	168	15.1	5.3	
03:17:00	160	15.1	5.3	
03:18:00	168	14.7	5.3	
03:19:00	163	15.0	5.3	
03:20:00	135	14.5	5.3	
03:21:00	150	15.1	5.2	
03:22:00	154	15.1	5.2	
03:23:00	154	14.8	5.2	
03:24:00	149	15.0	5.2	
03:25:00	154	15.0	5.2	
03:26:00	144	14.8	5.2	
03:27:00	131	14.9	5.2	
03:28:00	149	14.9	5.2	
03:29:00	149	15.0	5.2	
03:30:00	163	14.8	5.2	
03:31:00	149	15.1	5.2	
03:32:00	158	15.1	5.2	
03:33:00	135	14.9	5.2	
03:34:00	163	15.0	5.2	

PACR MicroVAX V2.0
27-NOV-91 13:54

Dowell Schlumberger



PACR PRINT

IMCO ALUMINUM
DISPOSAL WELL
ROBINSON
MORGANTOWN

MT. CARMEL ILL.
CEMENT 4 1/2 LINER
C1-03-7030
11-27-91

TIME	PRESSURE W.H. PRESS PSI	DENSITY UI DENSITY PPG	FLOW RATE UI FLOW BPM	EVENTS
03:35:00	135	14.5	5.0	
03:36:00	66	14.4	4.2	
03:37:00	135	15.2	4.9	
03:38:00	131	15.4	4.8	
03:39:00	200	15.8	4.7	
03:40:00	24	14.4	3.7	
03:41:00	47	15.2	3.7	
03:42:00	33	14.3	3.3	
03:42:20				DROP TOP PLUG
03:42:20				START DISPLACEMENT
03:43:00	103	11.2	2.6	
03:44:00	0	8.9	0.0	
03:45:00	0	8.7	0.0	
03:46:00	1	8.7	4.2	
03:47:00	0	8.6	2.9	
03:48:00	43	8.6	2.4	
03:49:00	755	8.6	5.2	
03:50:00	741	8.6	4.7	
03:51:00	810	8.5	4.3	
03:52:00	866	8.6	4.0	
03:53:00	968	8.6	3.8	
03:54:00	1000	8.6	3.5	
03:55:00	1082	8.5	3.4	
03:56:00	1051	8.5	2.7	
03:57:00	1097	8.5	2.2	

PACK MicroVAX V2.0
27-NOV-91 13:54

Dowell Schlumberger



PACR PRINT

IMCO ALUMINUM
DISPOSAL WELL
ROBINSON
MORGANTOWN

MT. CARMEL ILL.
CEMENT 4 1/2 LINER
01-03-7030
11-27-91

TIME	PRESSURE	DENSITY	FLOW RATE	EVENTS
HH:MM:SS	W.H. PRESS PSI	UL DENSITY PPG	UL FLOW BPM	
03:52:00	1139	8.5	1.9	
03:52:00	1328	8.5	2.9	
04:00:00	1370	8.5	2.8	
04:01:00	1768	8.5	2.4	
04:01:00				BUMP TOP PLUG
04:02:00	2059	8.5	0.0	
04:03:00	2027	8.5	0.0	
04:03:00				BLEED-OFF PRESSURE
04:03:00	1430	8.5	0.0	
04:03:00	1587	8.4	0.0	
04:03:00				RIG PULL OUT OFF STRINGER
04:03:00				START REVERSE CIRCULATION
04:03:00	596	8.6	0.0	
04:03:00				REVERSE 43BBL CEMENT
04:03:00	415	8.5	0.4	
04:03:00	602	8.6	3.0	
04:03:00	588	8.6	3.2	
04:10:00	538	8.6	3.1	
04:11:00	584	8.6	3.2	
04:12:00	538	8.6	3.1	
04:13:00	584	8.6	3.1	
04:14:00	579	8.6	3.1	
04:15:00	584	8.6	3.1	
04:16:00	538	8.6	3.1	
04:17:00	514	8.6	3.2	

PACR MicroVAX V2.0
27-NOV-91 13:54

Dowell Schlumberger



PACR PRINT

IMCC ALUMINUM
DISPOSAL WELL
ROBINSON
MORGANTOWN

MT. CARMEL ILL.
CEMENT 4 1/2 LINER
01-03-7030
11-27-93

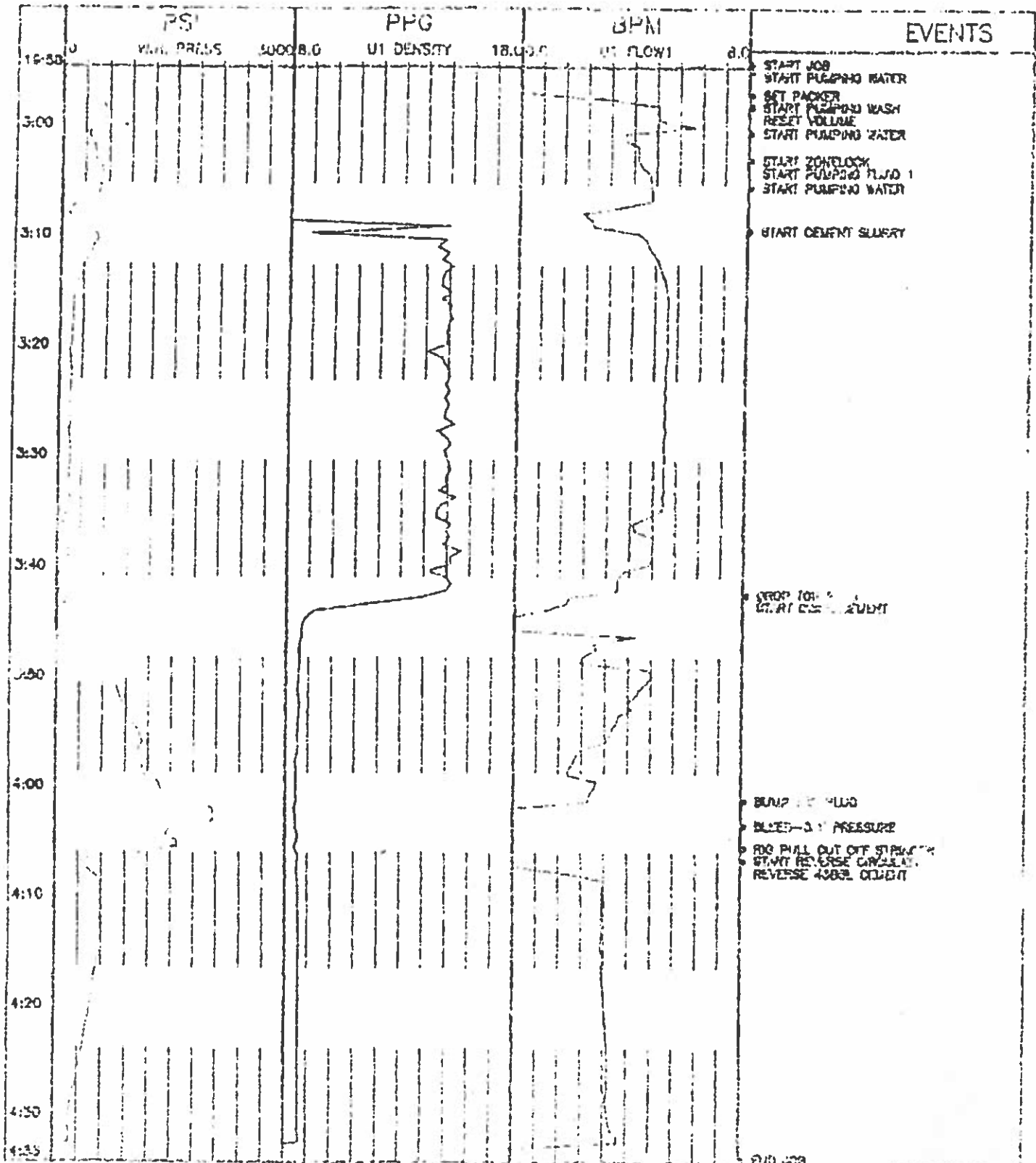
TIME	PRESSURE W.H. PRESS PSI	DENSITY UI DENSITY PPG	FLOW RATE		EVENTS
			UI FLOW	BPM	
04:18:00	501	8.6	3.2	3.2	
04:19:00	473	8.6	3.2	3.2	
04:20:00	450	8.6	3.2	3.2	
04:21:00	427	8.6	3.3	3.3	
04:22:00	394	8.6	3.3	3.3	
04:23:00	362	8.6	3.3	3.3	
04:24:00	348	8.6	3.4	3.4	
04:25:00	311	8.6	3.4	3.4	
04:26:00	283	8.6	3.3	3.3	
04:27:00	260	8.5	3.4	3.4	
04:28:00	223	8.7	3.3	3.3	
04:29:00	214	8.6	3.4	3.4	
04:30:00	205	8.6	3.4	3.4	
04:31:00	205	8.6	3.5	3.5	
04:32:00	200	8.6	3.7	3.7	
04:33:00	0	5.0	0.0	0.0	
04:33:56	0	5.0	0.0	0.0	

PACR PLOT



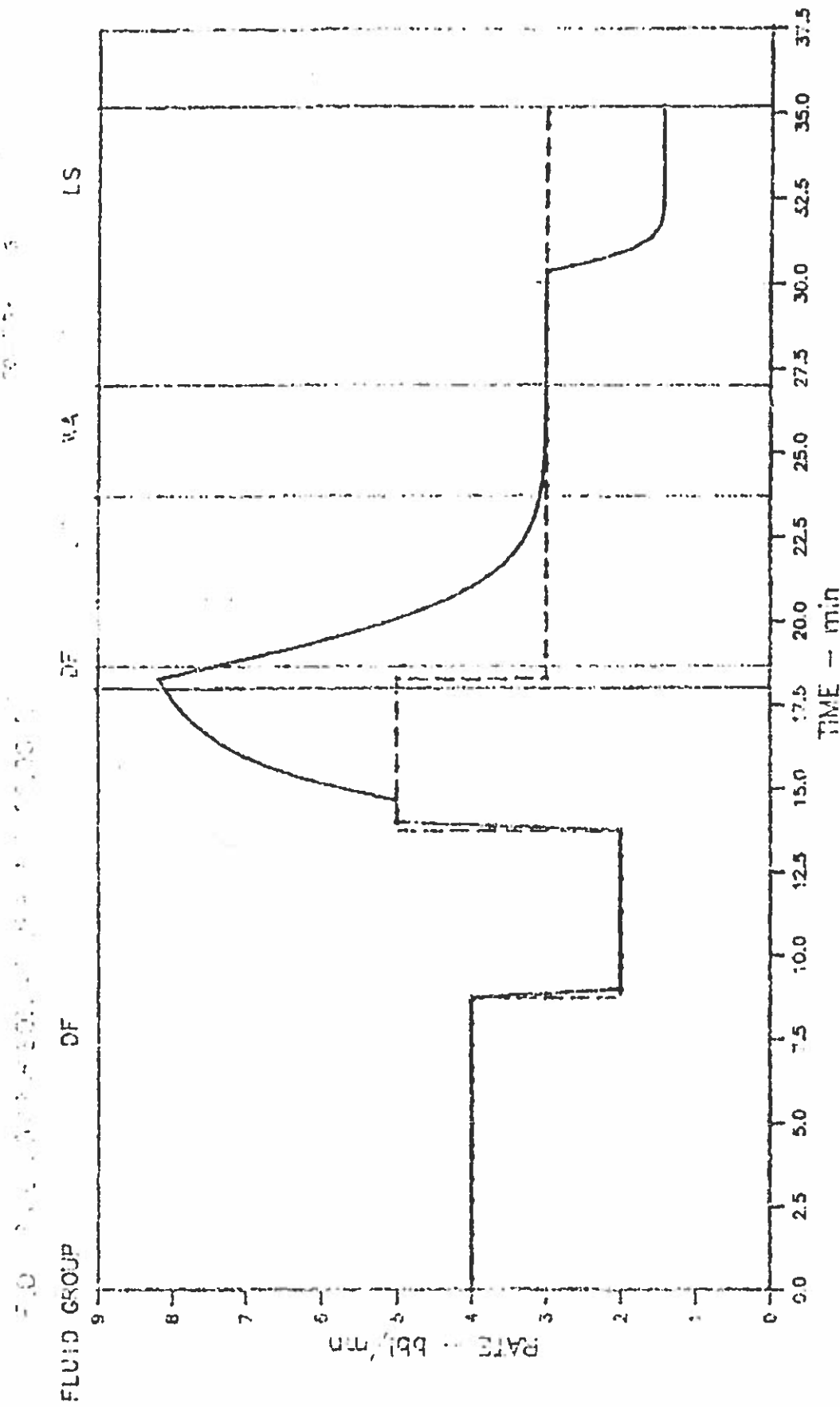
INGO ALUMINUM
DISPOSAL WELL
ROBINSON
MORGANTOWN

MT. CARMEL LL
CEMENT 4 1/2 LINER
01-03-7030
11-27-81



CemCADE PLACEMENT DESIGN

100-15055-1

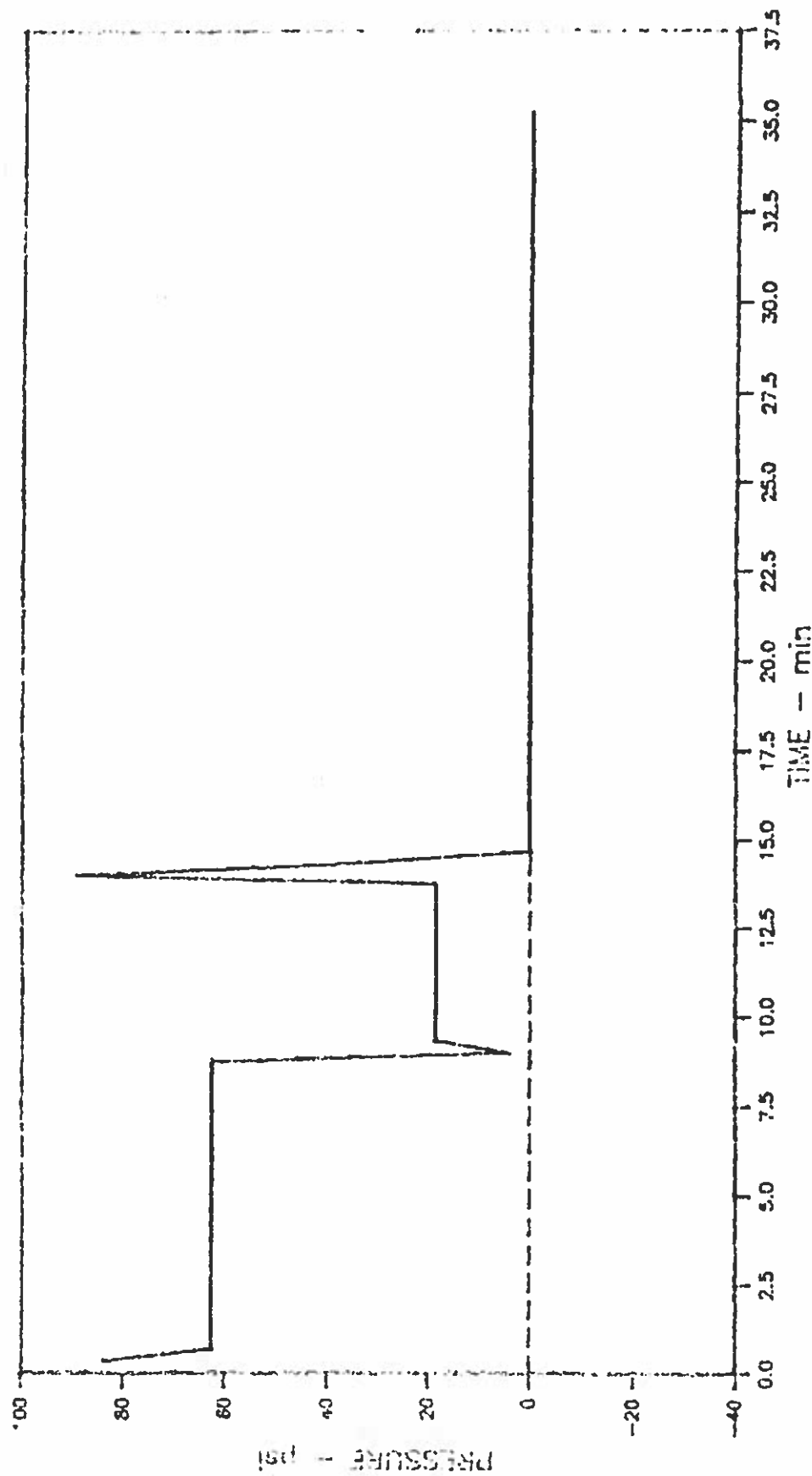


— FLOW RATE OUT
— PUMP RATE IN

PLOT SHOWS ANNUAL RETURNS RATE AGAINST CORRESPONDING PUMP RATE INTO THE CASING AND INDICATES EACH FLUID PASSING THE ZONE INDICATED



CemCADE PLACEMENT DESIGN

[illegible]

— WELL HEAD PRESSURE

--- BACK PRESSURE APPLIED TO THE ANVILS



Project: *1-7-5*

Location: *1-7-5*

Drawn by: *1-7-5*

Scale: *1-7-5*

Notes: *1-7-5*

Reinforcement Details:

Bar Size	Bar Spacing	Bar Length	Bar Quantity
1/2"	12"	10'	10
3/4"	12"	10'	10
1"	12"	10'	10
1 1/4"	12"	10'	10
1 1/2"	12"	10'	10
2"	12"	10'	10

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1 1/2"	12"	10'	10	
2"	12"	10'	10	
2 1/2"	12"	10'	10	
3"	12"	10'	10	
3 1/2"	12"	10'	10	
4"	12"	10'	10	
4 1/2"	12"	10'	10	
5"	12"	10'	10	
5 1/2"	12"	10'	10	
6"	12"	10'	10	
6 1/2"	12"	10'	10	
7"	12"	10'	10	
7 1/2"	12"	10'	10	
8"	12"	10'	10	
8 1/2"	12"	10'	10	
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94"	12"	10'	10	
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95 1/2"	12"	10'	10	
96"	12"	10'	10	
96 1/2"	12"	10'	10	
97"	12"	10'	10	
97 1/2"	12"	10'	10	
98"	12"	10'	10	
98 1/2"	12"	10'	10	
99"	12"	10'	10	
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Notes: *1-7-5*

Reinforcement Details:

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DOWELL SCHLUMBERGER INCORPORATED

SCALE TICKET FOR ELECTRONIC WEIGHING DEVICES

Nº 234225

SHIPPED BY

PRODUCT

BILL OF LADING NO.

TRUCK NO.

WEIGHT 47440 LB GROSS
20:23 24NOV91

TARE

WEIGHT 27200 LB NET
11:16 27NOV91

USED 19740 lbs

LER

DISTRICT

DATE

ER

TIME

DRESS

CITY Morgantown STATE KY ZIP 40001

DRIVER ON

OFF



DOWELL SCHLUMBERGER INCORPORATED

SCALE TICKET FOR ELECTRONIC WEIGHING DEVICES

Nº 234226

WEIGHED BY

PRODUCT

NO. / BILL OF LADING NO.

TRUCK NO.

WEIGHT 35220 LB GROSS
20:02 24NOV91

TARE

WEIGHT 41640 LB NET
11:14 27NOV91

USED 44080 lbs

SELLER

DISTRICT

DATE

BUYER

TIME

ADDRESS

CITY Morgantown STATE KY ZIP 40226

DRIVER ON

OFF

WORK ORDER CONTRACT
AND PRE-TREATMENT DATAATTACH TO
INVOICE & TICKET NO. 2140279DISTRICT Hill Country TexasDATE 2-5-92

HALLIBURTON SERVICES

YOU ARE HEREBY REQUESTED TO FURNISH EQUIPMENT AND SERVICEMEN TO DELIVER AND OPERATE

THE SAME AS AN INDEPENDENT CONTRACTOR TO: A & M Eng. (CUSTOMER)
AND DELIVER AND SELL PRODUCTS, SUPPLIES, AND MATERIALS FOR THE PURPOSE OF SERVICINGWELL NO. 1 LEASE Trico Recycling SEC. _____ TWP. _____ RANGE _____FIELD W.C. COUNTY _____ STATE KV OWNED BY S. J. J. J.

THE FOLLOWING INFORMATION WAS FURNISHED BY THE CUSTOMER OR HIS AGENT -

FORMATION NAME	TYPE	NEW USED	WEIGHT	SIZE	FROM	TO	MAX. ALLOW P.S.I.
CASING		1	20	7		2450	
LINER		1	105	4.5	2300	4705	
TUBING		1	2	2.5	2250	71.00	
OPEN HOLE				6 1/2	4150	4450	SHOTS/FT.
PERFORATIONS							
PERFORATIONS							
PERFORATIONS							

INITIAL PROD: OIL _____ SPD, H₂O _____ BPD, GAS _____ MCFPRESENT PROD: OIL _____ SPD, H₂O _____ BPD, GAS _____ MCF

PREVIOUS TREATMENT: DATE _____ TYPE _____

TREATMENT INSTRUCTIONS: TREAT THRU TUBING ☐ ANNULUS ☐ CASING ☐ TUBING/ANNULUS ☐ HYDRAULIC HORSEPOWER ORDERED _____Pressure Test

CUSTOMER OR HIS AGENT WARRANTS THE WELL IS IN PROPER CONDITION TO RECEIVE THE PRODUCTS, SUPPLIES, MATERIALS, AND SERVICES

As consideration, the above-named Customer agrees:

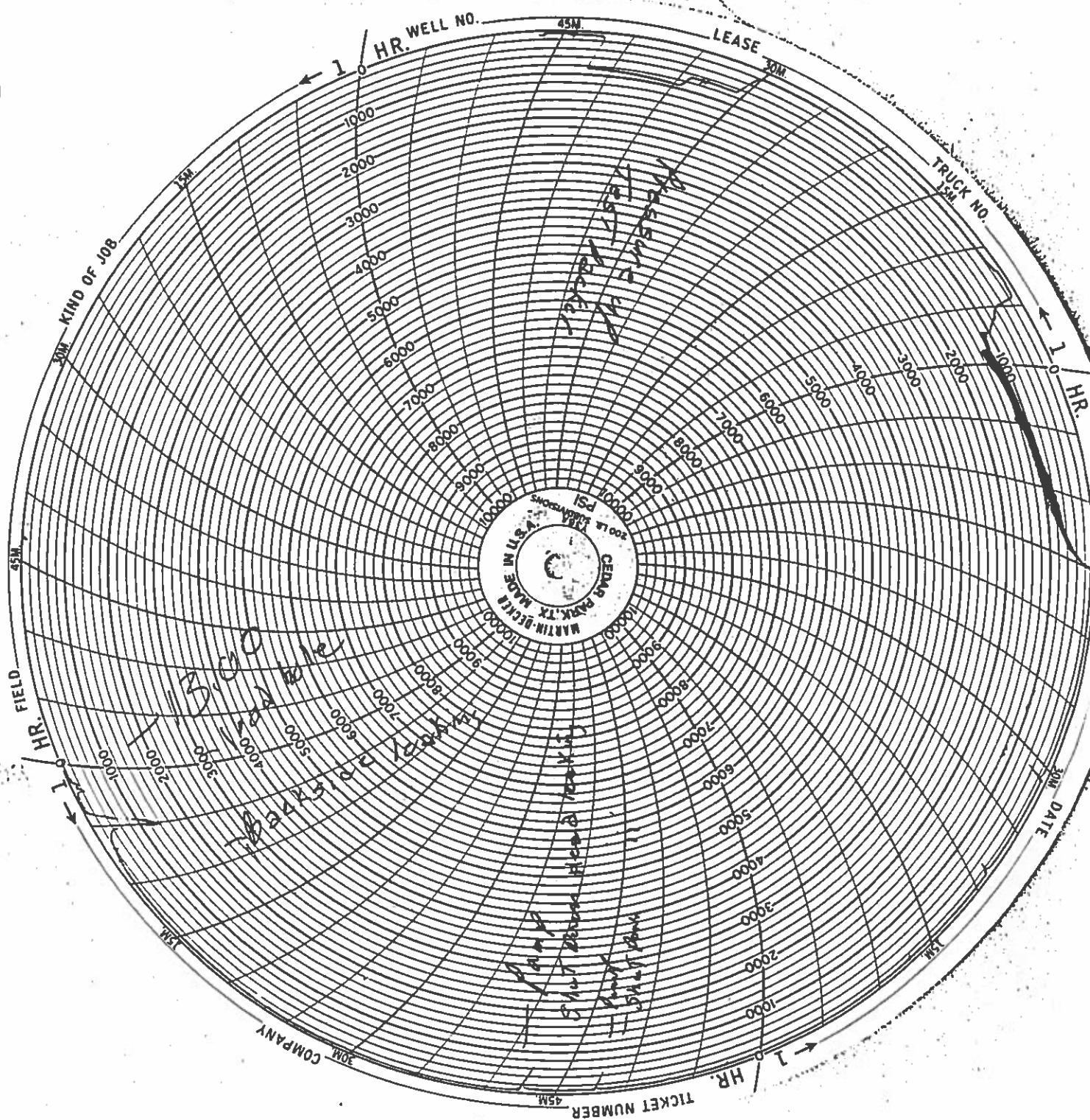
THIS CONTRACT MUST BE SIGNED BEFORE WORK IS COMMENCED

- To pay Halliburton in accord with the rates and terms stated in Halliburton's current price list. Payment is payable NET by the 20th of the following month after date of invoice. Upon Customer's default in payment of Customer's account by the last day of the month following the month in which the invoice is dated, Customer agrees to pay interest thereon after default at the highest lawful contract rate applicable but never to exceed 18% per annum. In the event it becomes necessary to employ attorneys to enforce collection of said account, Customer agrees to pay all collection costs and attorney fees in the amount of 20% of the amount of the unpaid account.
 - To defend, indemnify, release and hold harmless Halliburton, its divisions, subsidiaries, parent and affiliated companies and the officers, directors, employees, agents and servants of all of them from and against any claims, liability, expenses, attorneys fees, and costs of defense to the extent permitted by law for:
 - Damage to property owned by, in the possession of, or leased by Customer, and/or the less owner (if different from Customer) including, but not limited to, surface and subsurface damage. The term "well owner" shall include working and royalty interest owners.
 - Reservoir, formation, or well loss or damage, subsurface trespass or any action in the nature of trespass.
 - Personal injury or death or property damage (including, but not limited to, damage to the reservoir, formation or well, or any damages whatsoever, growing out of or in any way connected with or resulting from pollution, subsurface pressure, losing control of the well and/or a well blowout or the use of radioactive material.
- The defense, indemnity, release and hold harmless obligations of Customer provided for in this Section b) and Section c) below shall apply to claims or liability even if caused or contributed to by Halliburton's negligence, strict liability, or the unseaworthiness of any vessel owned, operated, or furnished by Halliburton or any defect in the data, products, supplies, materials, or equipment of Halliburton whether in the preparation, design, manufacture, distribution, or marketing thereof, or from a failure to warn any person of such defect. Such defense, indemnity, release and hold harmless obligations of Customer shall not apply where the claims or liability are caused by the gross negligence or willful misconduct of Halliburton. The term "Halliburton," as used in said Sections b) and c) shall mean Halliburton, its divisions, subsidiaries, parent and affiliated companies, and the officers, directors, employees, agents and servants of all of them.
- That because of the uncertainty of variable well conditions and the necessity of relying on facts and supporting services furnished by others, Halliburton is unable to guarantee the effectiveness of the products, supplies or materials, nor the results of any treatment or service, nor the accuracy of any chart interpretation, research analysis, log recommendation or other data furnished by Halliburton. Halliburton personnel will use their best efforts in gathering such information and their best judgment in interpreting it. Customer agrees that Halliburton shall not be liable for and Customer shall indemnify Halliburton against any damages arising from the use of such information.
 - That Halliburton warrants only title to the products, supplies and materials and that the same are free from defects in workmanship and materials. THERE ARE NO WARRANTIES, EXPRESS OR IMPLIED OF MERCHANTABILITY, FITNESS OR OTHERWISE WHICH EXTEND BEYOND THOSE STATED IN THE IMMEDIATELY PRECEDING SENTENCE. Halliburton's liability and Customer's exclusive remedy in any cause of action (whether in contract, tort, breach of warranty or otherwise) arising out of the sale or use of any products, supplies or materials is expressly limited to the replacement of such products, supplies or materials on their return to Halliburton or, at Halliburton's option, to the allowance to the Customer of credit for the cost of such items. In no event shall Halliburton be liable for special, incidental, indirect punitive or consequential damages.
 - That Customer shall, at its risk and expense, attempt to recover any Halliburton equipment, tools or instruments which are lost in the well and if such equipment, tools or instruments are not recovered, Customer shall pay Halliburton its replacement cost unless such loss is due to the sole negligence of Halliburton. If Halliburton equipment, tools or instruments are damaged in the well, Customer shall pay Halliburton the lesser of its replacement cost or the cost of repairs unless such damage is caused by the sole negligence of Halliburton. In the case of equipment, tools or instruments for marine operations, Customer shall, in addition to the foregoing, be fully responsible for loss of or damage to any of Halliburton's equipment, tools or instruments which occurs at any time after delivery to Customer at the landing unit, returned to the landing, unless such loss or damage is caused by the sole negligence of Halliburton.
 - To waive the provisions of the Deceptive Trade Practices - Consumer Protection Act, to the extent permitted by law.
 - That this contract shall be governed by the law of the state where services are performed or materials are furnished.
 - That Halliburton shall not be bound by any changes or modifications in this contract, except where such change or modification is made in writing by a duly authorized executive officer of Halliburton.

I HAVE READ AND UNDERSTAND THIS CONTRACT AND REPRESENT
THAT I AM AUTHORIZED TO SIGN THE SAME AS CUSTOMER'S AGENTSIGNED [Signature] CUSTOMERDATE 2-5-92 TIME 12:30 A.M. P.M.

We certify that the Fair Labor Standards Act of 1938, as amended, has been complied with in the production of goods and/or with respect to services furnished under this contract.

CUSTOMER





McCOY & McCOY ENVIRONMENTAL CONSULTANTS, INC.
A SUBSIDIARY OF McCOY & McCOY, INC.

UIC MECHANICAL INTEGRITY TEST



EPA

Region IV Water Supply Branch
345 Courtland St. NE
Atlanta, Georgia 30385
Phone (404)347-3886

WELL IDENTIFICATION

OPERATOR IMCO Recycling, Inc. EPA KYS NO. KYS0310117
ADDRESS 1503-1511 North 8th Street LEASE NAME IMCO Well #1
Sapulpa, OK 74066 WELL NO. IMCO Well #1
PHONE (918) 665-6575 STATE PERMIT NO. 81179 POOL N/A
2340 FSL: 160 FEL: 14 I: 34 STATE NAME/CODE KY/21 TN/47 (circle one)
COUNTY NAME Butler COUNTY CODE 031

WELL COMPLETION

WELL TYPE (code) 1 TOTAL DEPTH 6457 (ft) SURFACE ELEVATION 445.6 (ft MSL)
CASING STRING CASING DIAMETER (inches) CEMENT SHOE DEPTH CEMENT VOLUME (sacks/type) PACKER TYPE Baker R-3 Double-grip
Surface 9 5/8" 471 300 / A' PACKER DEPTH 4690.83 (ft)
Intermediate 7" 2542 450 / A' MAX. INJECTING PRES. 2700 (psi)
Production 4 1/2" 2300-4703 650 / A' EST. FRACTURE PRES. 3300 + (psi)
Tubing 3 1/2" 0-2247 PERFORATIONS @ Open Hole (ft)
2 7/8" 2247-4690
NAME New Albany to top of Knox LOWERMOST USDW FORMATION NAME Penn. sand
CONFINING FORMATION TOP ELEVATION 2330 (MSL) BASE ELEVATION 250 (MSL)
THICKNESS 2370 (ft) INJECTION FORMATION FORMATION NAME Knox
TOP ELEVATION 4700 (MSL)

MIT TEST DATA

TEST DATE 10/9/92 INJECTED FLUID _____ Sg _____
EXTERNAL MIT- CEMENT RECORD ☒ LOGS ☐ ANNULAR FLUID _____ Sg _____
TYPE OF TEST SHUT-IN ☒ INJECTING ☐ (check one) INJECTION RATE _____ (bbl/day)
INJECTION PRESSURE _____ (psi)

ANNULAR PRESSURE TEST

INITIAL TEST PRESSURE (psi) FINAL TEST PRESSURE (psi) PRESSURE CHANGE (+/- psi) LENGTH OF TEST (MINUTES)
ANNULAR SPACE 309 303 -6 30

COMMENTS

9 5/8" T.O.C. @ surface; 7" T.O.C. @ surface; 4 1/2" - cemented.
initial MIT
Pam
OPERATOR REPRESENTATIVE Jeffrey Tramm UIC INSPECTOR David M. Ollman



McCOY & McCOY ENVIRONMENTAL CONSULTANTS, INC.
A DIVISION OF MCCOY & MCCOY, INC.

NOTICE OF INSPECTION



EPA

INSPECTION CONTRACTOR McCoy & McCoy, Inc. P.O. Box 11279 Lexington, Kentucky 40574 606-299-7775	FIRM TO BE INSPECTED IMCO Recycling, Inc.	ADDRESS (EPA Regional Office) Environmental Protection Agency Region IV, Ground Water Protection Branch 345 Courtland St. NE Atlanta, Georgia 30365 404-347-3379
--	---	--

This document constitutes written notice pursuant to 42 U.S.C. § 300j-4 (b)(1) of inspection by duly authorized personnel of the U.S. Environmental Protection Agency of this facility noted below.

REASON FOR INSPECTION *New Well Construction*

The purpose of inspection is to determine whether the person (including any corporation or partnership) subject to any applicable underground injection control program has acted or is acting in compliance with The Safe Drinking Water Act and all regulations promulgated thereunder, including underground injection control (UIC) regulations and any applicable permit or rule.

IMCO Well #1

Ran 2 3/8" tubing with 7' long hanger and 2393' of 4 1/2" casing to 4718'. Hung casing at 2318'.

Pumped 650 sks = 158 bbls, weight = 14.8 lbs/gal, yield = 1.37 cu. ft./sk

Cement: Class A w/ 2% gyp-seal, 3% KCl, .2% Antifoam (D46), .2% Calcium lignosulfate (D13), and .6% D127 Cement work by Dowell-Schlumberger.

After pumping cement (135% calculated volume), rubber plugs were chased w/ 50 bbls water. Then tubing was disconnected from hanger and excess cement was circulated out of annular space between 7" casing and tubing.

Section 1445(b) of the SDWA (42 U.S.C. § 300j-4 (b)) is quoted on the reverse of this form.

Receipt of this Notice of Inspection is hereby acknowledged.

FIRM REPRESENTATIVE <i>Ingram Tamm</i>	DATE <i>11/27/91</i>	INSPECTOR (McCoy & McCoy) <i>David M. McNamee</i>
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McCoy & McCoy Environmental Consultants, Inc.
a subsidiary of McCoy & McCoy, Inc.

New Well Construction ~~UIC MECHANICAL~~ ~~INTEGRITY TEST~~



Region IV Water Supply Branch
345 Courtland St. NE
Atlanta, Georgia 30385
Phone (404)347-3868

WELL IDENTIFICATION

OPERATOR <u>TMCO Recycling, Inc.</u>	EPA KYS NO. <u>KYID429</u>
ADDRESS <u>1503-1511 North 8th St.</u> <u>Sapula, OK 74066</u>	LEASE NAME WELL NO. <u>TMCO Well #1</u>
PHONE # <u>(918) 665-6575</u>	STATE PERMIT NO. <u>81179</u> POOL _____
2340 FSL: <u>160</u> FEL: <u>14</u> I: <u>34</u>	STATE NAME/CODE <u>KY/21</u> TN/47 (circle one) COUNTY NAME <u>Butler</u> COUNTY CODE <u>031</u>

WELL COMPLETION

WELL TYPE (code) <u>I</u>	TOTAL DEPTH <u>6450 - Driller</u> <u>6457 - Logger!!!</u>	SURFACE ELEVATION <u>445.6</u> (ft MSL)			
CASING STRING	CASING DIAMETER (inches)	CEMENT SHOE DEPTH	CEMENT VOLUME (sacks/type)	PACKER TYPE _____	PACKER DEPTH _____ (ft)
Surface	_____	_____	_____	MAX. INJECTING PRES. _____ (psi)	EST. FRACTURE PRES. _____ (psi)
Intermediate	<u>4 1/2"</u>	<u>4778</u>	<u>650 sks A'</u>	PERFORATIONS @ _____ (ft)	
Production	_____	_____	<u>at 2% gyps um</u>		
Tubing	_____	_____	_____		
CONFINING FORMATION	NAME _____	TOP ELEVATION _____ (MSL)	THICKNESS _____ (ft)	LOWERMOST USDW	FORMATION NAME _____
					BASE ELEVATION _____ (MSL)
				INJECTION FORMATION	FORMATION NAME _____
					TOP ELEVATION _____ (MSL)

MIT TEST DATA

TEST DATE <u>11/26/91 - 11/27/91</u>	INJECTED FLUID _____ Sg _____
EXTERNAL MIT CEMENT RECORD <input type="checkbox"/> LOGS <input type="checkbox"/>	ANNULAR FLUID _____ Sg _____
TYPE OF TEST	INJECTION RATE _____ (bbl/day)
SHUT-IN <input type="checkbox"/> (check one)	INJECTION PRESSURE _____ (psi)
INJECTING <input type="checkbox"/>	

ANNULAR PRESSURE TEST

INITIAL TEST PRESSURE (psi)	FINAL TEST PRESSURE (psi)	PRESSURE CHANGE (+/- psi)	LENGTH OF TEST (MINUTES)
ANNULAR SPACE _____	_____	_____	_____

COMMENTS

New well construction - deepen well to new completion zone.
New 4 1/2" casing: 10.5 #, type K-55 STC (seamless casing with
short thread collars). 4 1/2" pipe tally = 2392.91' plus 7' long hanger
= 2400'. Top of hanger @ 2318'. Casing hung by Baker Tool Service
Out of Oklahoma. Cement work by Dowell-Schlumberger out of Mt. Carmi, IL.
Pumped 650 sks (2% DS3, 3% KCI), chased rubber plugs with 50 bbls H₂O.
OPERATOR REPRESENTATIVE Jeffrey Tamm UIC INSPECTOR David M. Williams

WELL DATA

FIELD	WC	SEC	TWP	RNG	COUNTY	Butler	STATE	Ky
FORMATION NAME	TYPE							
FORMATION THICKNESS	FROM		TO					
INITIAL PROD: OIL	BPD	WATER	BPD	GAS	MCFD			
PRESENT PROD: OIL	BPD	WATER	BPD	GAS	MCFD			
COMPLETION DATE	MUD TYPE		MUD WT.					
PACKER TYPE	SET AT							
BOTTOM HOLE TEMP.	PRESSURE							
MISC. DATA	TOTAL DEPTH		6450					

JOB DATA

CALLER OUT	ON LOCATION	JOB STARTED	JOB COMPLETED
DATE 2-5-92	DATE 2-5-92	DATE 2-5-92	DATE 2-5-92
TIME 5:00	TIME 11:00	TIME 12:30	TIME 16:30

PERSONNEL AND SERVICE UNITS

NAME	UNIT NO. & TYPE	LOCATION
88008		
L. Jeffers	90175	25920
55347		
J. ADITT	52455	
81553		
W. J. J.	50734	

MATERIALS

TREAT. FLUID	DENSITY	LB/GAL-AP
DISPL. FLUID	DENSITY	LB/GAL-AP
PROP. TYPE	SIZE	LB
PROP. TYPE	SIZE	LB
ACID TYPE	GAL	%
ACID TYPE	GAL	%
ACID TYPE	GAL	%
REFRACTANT TYPE	GAL	IN
NE AGENT TYPE	GAL	IN
FLUID LOSS ADD. TYPE	GAL-LB	IN
GELLING AGENT TYPE	GAL-LB	IN
FRIC. RED. AGENT TYPE	GAL-LB	IN
BREAKER TYPE	GAL-LB	IN
BLOCKING AGENT TYPE	GAL-LB	
PERFPAC BALLS TYPE	QTY.	
OTHER		
OTHER		

CEMENT DATA

STAGE	NUMBER OF SACKS	CEMENT	BRAND	BULK SACKED	YIELD CU.FT./SK.	MIXED LBS./GAL.

PRESSURES IN PSI

CIRCULATING	DISPLACEMENT	
BREAKDOWN	MAXIMUM	
AVERAGE	FRACTURE GRADIENT	
SHUT-IN: INSTANT	5-MIN.	15-MIN.
HYDRAULIC HORSEPOWER		
ORDERED	AVAILABLE	USED
AVERAGE RATES IN BPM		
TREATING	DISPL	OVERALL
CEMENT LEFT IN PIPE		
FEET	REASON	

SUMMARY

VOLUMES

PRELUSH: BBL-GAL	TYPE
LOAD & SHOE: BBL-GAL	PAD: BBL-GAL
TREATMENT: BBL-GAL	DISPL: BBL-GAL
CEMENT SLURRY: BBL-GAL	
TOTAL VOLUME: BBL-GAL	

REMARKS

Customer Keep Chart

EXHIBIT L-7

**ANNULUS AND PACKER PRESSURE TEST
DATA**

Page 60
 Date: 10/1/68
 Time: 10:10
 Remarks:

Value 1 Unit 1 Pressure
 Value 2 Unit 1 and 2 Average Density
 Value 3 Unit 1 and 2 Total Flow rate
 Value 4 Standoff

Volume is computed from
 Units 1 and 2 Total Flow rate
 Scan Period (Sec) 40
 Playback Recording Rate was 1 second

TIME	VAL 1 (PSI)	VAL 2 (GPM)	VAL 3 (GPM)	VAL 4 ()	VOLUME (GAL)
01 58	877	0	0		0
01 59	841	0	0		0
PAUSE					
02 54	891	0	0		0
START PUMPING WATER					
02 54	891	0	0		0
02 55	7	0	0		0
02 56	10	7 57	0 26		0
SET PACKER TO					
02 56	320	7 59	4 27		1 1
02 57	340	7 59	4 05		4 9
START PUMPING OIL					
02 57	340	7 51	4 04		5 9
RESET VOLUME					
02 59	340	7 57	4 05		6 3
02 59	350	7 60	4 05		3 0
02 59	510	7 64	4 17		0 4
START PUMPING WATER					
03 00	350	7 63	3 62		10 5
03 00	430	7 72	4 11		14 1
03 00	433	7 74	4 13		17 4
03 00	434	7 75	4 16		20 7
START PUMPING FLUID 1 JUMP					
03 02	430	7 74	4 15		21 0
03 02	510	7 76	4 25		24 6
03 02	530	7 76	4 25		28 2
START PUMPING WATER					
03 03	490	7 79	4 67		32 0
03 03	490	7 82	4 64		35 9
03 03	110	7 84	3 71		38 0
03 03	100	7 87	2 15		40 6
03 03	100	10 12	2 62		42 9
START CEMENT SLURRY					
03 09	440	4 06	4 01		45 2
RESET VOLUME					
03 09	430	11 44	4 60		46 2
03 10	430	12 54	4 67		3 3
03 10	400	13 01	4 74		7 3
03 10	320	14 00	4 84		11 2
03 10	260	15 50	5 00		15 2
03 10	220	17 54	5 14		19 3
03 10	200	19 09	5 20		23 5
03 10	180	19 77	5 27		27 7
03 10	170	19 11	5 48		31 3
03 10	160	19 53	5 25		35 1
03 10	170	19 01	5 24		38 4
03 10	150	19 66	5 23		42 6
03 10	150	19 00	5 20		46 6
03 10	120	19 47	5 25		50 0
03 10	120	19 02	5 24		53 2
03 10	120	19 38	5 32		57 2
03 10	120	19 06	5 18		61 2
03 10	140	19 07	5 22		65 6
03 10	150	19 56	5 30		69 0
03 10	120	19 18	5 17		73 1
03 10	120	19 09	5 20		77 3
03 10	120	19 01	5 20		81 3
03 10	140	19 22	5 22		85 7
03 10	150	19 57	5 27		89 9
03 10	120	19 13	5 10		94 0
03 10	120	19 30	5 20		98 1
03 10	120	19 10	5 17		102 3
03 10	120	19 10	5 17		106 5
03 10	120	19 14	5 17		110 7
03 10	140	19 26	5 19		114 9
03 10	140	19 23	5 19		119 0
03 10	120	19 30	5 11		123 3
03 10	70	19 22	4 42		127 5
03 10	60	19 40	4 6		131 1
03 10	120	19 34	4 55		135 7
03 10	120	19 01	4 32		139 4
03 10	120	19 12	4 35		143 4
03 10	120	19 07	4 30		147 2
03 10	20	19 11	4 30		151 2
03 10	20	19 07	3 59		155 7
03 10	20	19 25	3 53		159 4
STOP FOR PAUSE					
03 40	200	19 47	1 40		161 5
START PUMPING WATER					
03 40	20	19 37	1 45		161 9
03 40	20	19 37	1 45		162 9
03 40	20	19 37	1 45		163 4
RESET VOLUME					
03 40	20	19 37	1 45		163 4

ATTACHMENT M

CONSTRUCTION DETAILS

Subsurface:

The construction details are discussed in Attachment Land are shown on Figure L-1.

Wellhead:

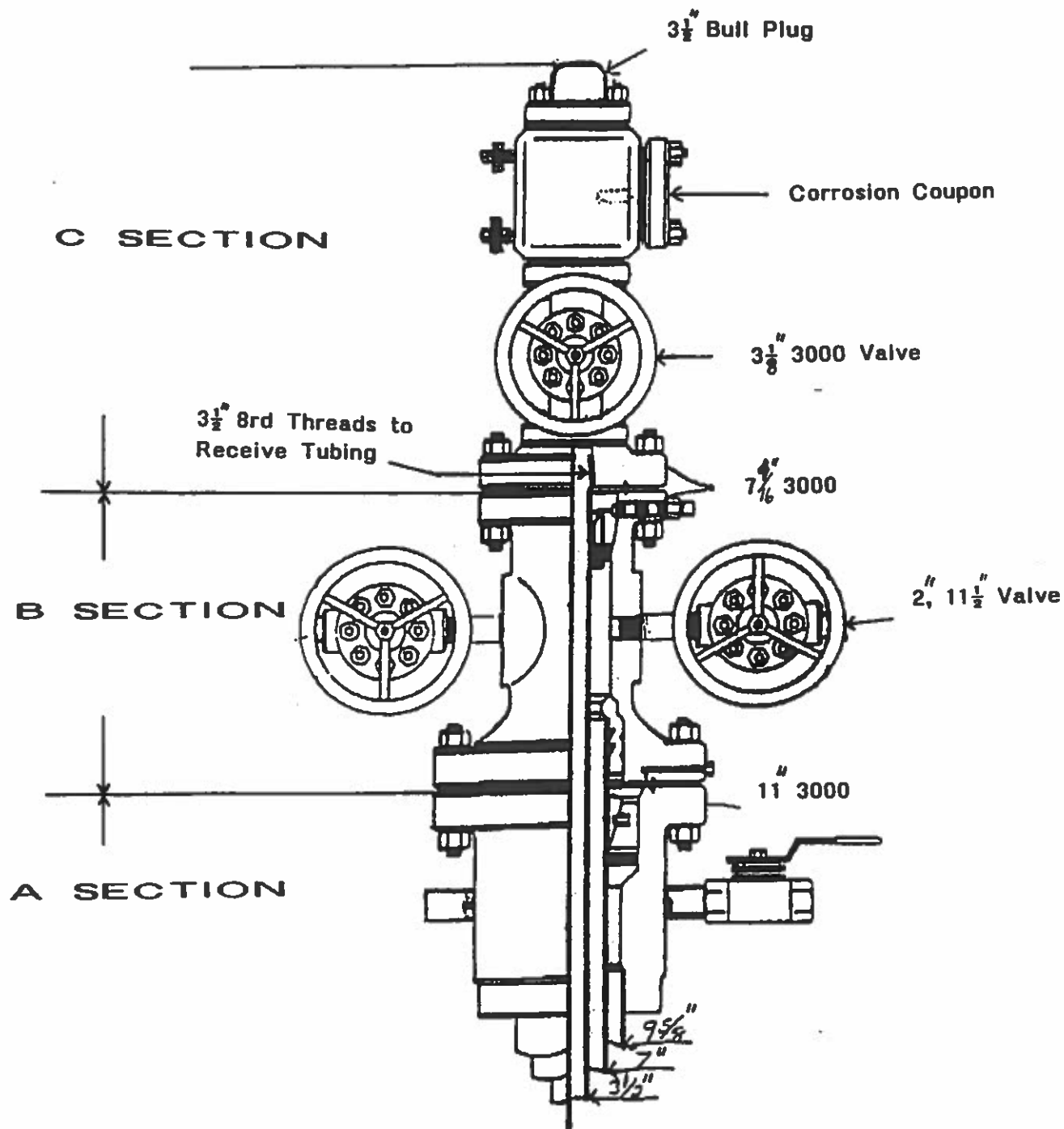
Figure M-1 shows the details of wellhead construction.

Surface Facilities:

Surface facilities include fluid suction system, filtration system, and injection pumping system. The surface facilities (filtration, injection pumping, and wellhead systems are enclosed in a building.

Suction System – The suction system consists of two 2-horsepower Teel Model 1P897 centrifugal pumps, each with separate intake screen located in the pond. Detail drawing of suction system is shown on Figure M-2. The suction system is also equipped with backwash system.

Filtration System – The filtration system consists of two Tritan Model TR 140 sand filters with filter size of 50 microns and greater. Each filter unit is rated at 140 gallons per minute and can be operated independently or together. The system also has a backwash capability. The filtration system and suction system are connected with 3" plastic pipe of approximately 450 feet in length. Detail drawing of filtration system is shown on Figure M-3.



**A & M ENGINEERING AND
ENVIRONMENTAL SERVICES, INC.**

ENGINEERING - ENVIRONMENTAL - CONSTRUCTION

WELLHEAD

SCALE:

DATE:

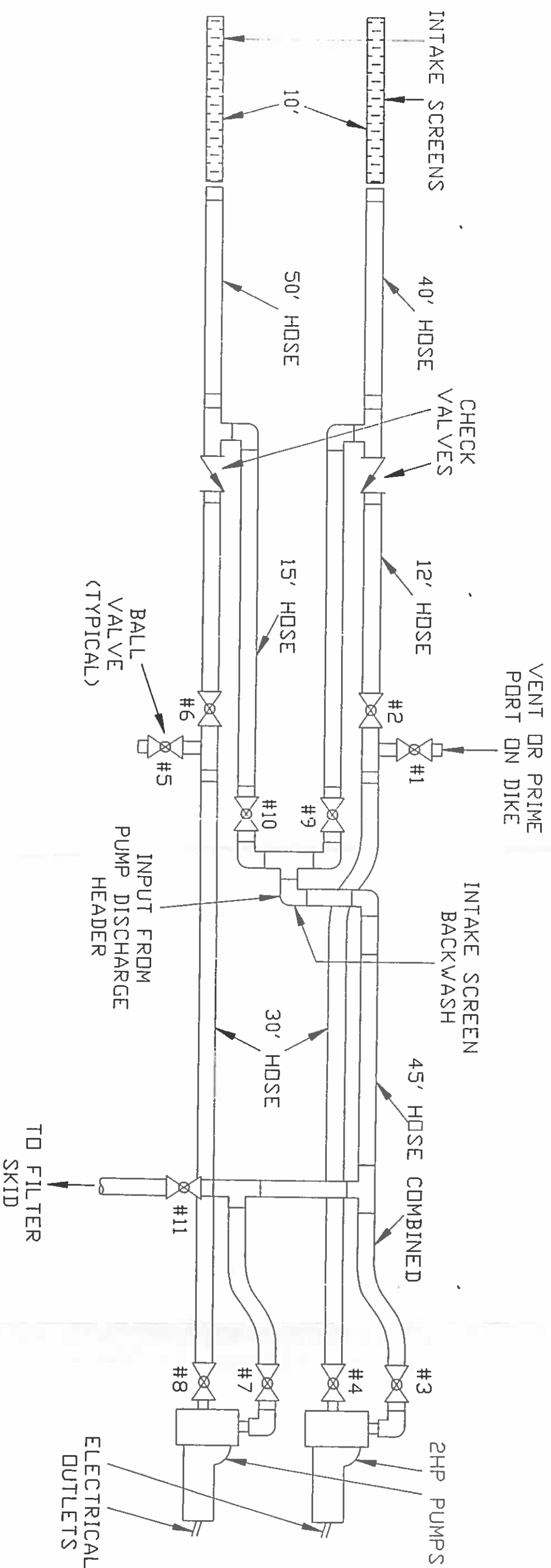
FIGURE NO.

M-1

APPROVED BY:

DRAWN BY:


DRAWING NO.



GENERAL NOTES

ALL HOSES ARE 4" IN DIAMETER.

REVISIONS		BY	DATE	DESCRIPTION



A & M ENVIRONMENTAL SERVICES, INC.

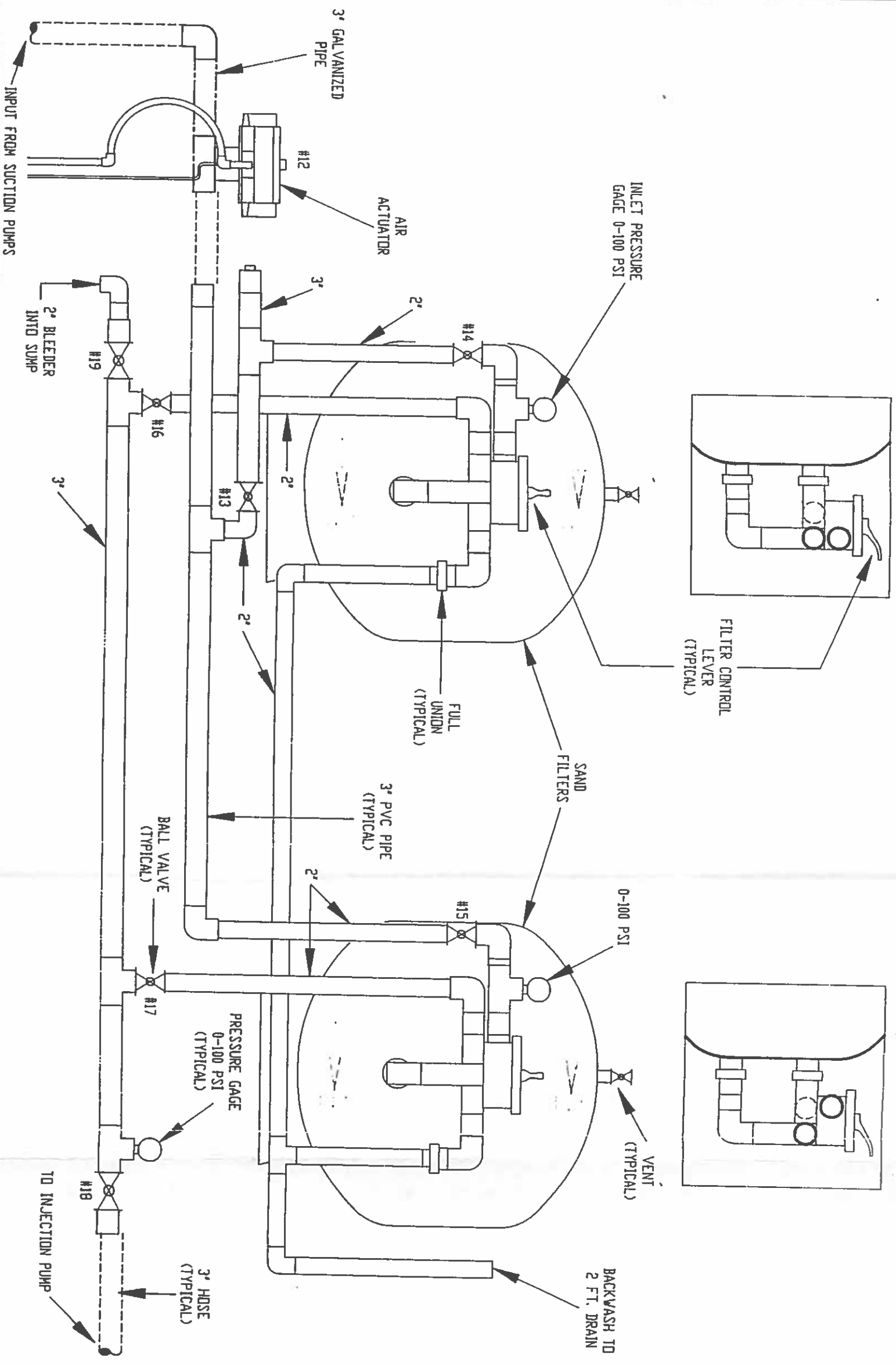
ENGINEERING - ENVIRONMENTAL - CONSTRUCTION

DATE	DESIGNED BY	CHECKED BY	DATE

KENTUCKY PRIMING POND PUMP SUCTION

FIGURE M-2

DATE	DESIGNED BY	CHECKED BY	DATE



GENERAL NOTES

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A & H ENGINEERING AND
ENVIRONMENTAL SERVICES, INC.

KENTUCKY
FILTER SYSTEM
FIGURE M-3

NTS 1226

Injection Pumping and Monitoring System – The filter system and the injection pump at the wellhead are connected together with 3 inch diameter steel supported rubber hose line.

The injection pump consists of Tritan Model 3150 AB Plunger pump with three 2.5 inch plungers with 3.5 inch stroke. The flow rate with a 6.5 inch sheave on the drive motor is 65 gpm. The pump discharge pressure is regulated by a Hydro-Seal pressure relief valve adjustable from 500 psig to 2,000 psig. The bypassed or relief fluid flows through a separate 2 inch plastic line back to the pond. The system is designed to operate at 1,750 psig or less due to the horsepower limitation of the drive motor.

The drive motor is an electric 3 phase 460 volt ac 100 horsepower motor with a 450T frame. The starter is reduced voltage starter for reducing the surge in the power grid. The motor is thermally protected by the starter from overload.

Suction pressure of 10 psig or greater is required to start the injection motor. The suction pressure is monitored by a Dresser/Ashcroft Model B424B normally open pressure switch and one pen of a PMC Model 212-2 seven day dual pen chart recorder.

The discharge pressure which is the same as the injection pressure is monitored by the other pen in the PMC recorder and a Dresser/Ashcroft Model B424B normally pressure switch set at 400 psig. The chart pressure range is from 0 to 2,000 psig. The pressure switch closes when the discharge pressure rises above 400 psig which is only used when the system is in automatic. In the manual mode, the discharge pressure switch is not in the control circuit.

A 2-inch Daniels Model CR turbine meter is used to measure the flow of fluid into the injection well. A Daniels Model 2403 battery powered totalizer is used to maintain the records of how many gallons of fluid have been injected into the well. The system works by the turbine blades located in the stream of fluid rotating past a magnet which produces up an electric signal each time a turbine blade passes the magnet. The totalizer

counts the electric pulses and converts these into gallons. Specifically, each gallon produces 116 pulses with the 2 inch flow meter. This dividing number is manually set into a register in the totalizer.

The same pulses are fed parallel into a Transpak Frequency Input Isolating Two Wire Transmitter Model T671 and converted into a 4 to 20 milliamp signal. With no flow, the signal is 4 milliamps and with 100 gpm, the signal is 20 milliamps. This signal is fed into a Partlow Model ARC 4100 seven day chart recorder to provide a recording of the instantaneous flow rate into the injection well.

The injection fluid temperature is monitored by a C.E. Invalco Pressure/Temperature recorder. The temperature range is from 0 to 150 degrees F.

Detail drawing of the system is shown on Figure M-4.

ATTACHMENT N

NOT APPLICABLE

ATTACHMENT O

PLANS FOR WELL FAILURE

Emergency procedures for the injection well are simplified by:

- 1) the fact that no hazardous fluids will be injected, and
- 2) high pressure and low pressure switches are installed in the system.

The pressure switches are connected to the actuator and to the injection pump and the suction pump. In case of emergency (higher pressure or lower pressure than normal operation pressure), the pressure switches will actuate the actuator to close the ball valve at the wellhead and turn off the pumps to stop fluid suction from the pond and stop fluid injection. When the injection pump and the suction pump shut off, no injection fluid will be transported from the retention pond to the injection well. Thus, a spill amount will be very limited.

In the event of an emergency involving a spill in the vicinity of the suction and filter system, the wellhead or along the hose, the first response shall be containment of lost non-hazardous fluid in a diked and lined area around the source of the spill. Then this lost non-hazardous fluid will be returned to the pond for reinjection by placing a small portable pump equipped with flexible hose. In such situations, will notify the U.S. EPA Region IV Groundwater Division, UIC Section within 24 hours of occurrence (404-347-3379).

Repair work shall commence as soon as emergency clean-up procedures are complete. A report will be prepared and submitted to the U.S. EPA Region IV.

ATTACHMENT P

MONITORING PROGRAM

Monitoring represents the feed back mechanism which defines the success of the project and quickly identifies developing problems. During well operations, Aleris Recycling Inc. monitors quality of injected fluid, injection pressure, injection temperature, annulus pressure, and flow rate. The monitoring results are reported quarterly to the U.S. Environmental Protection Agency, Region IV.

Quality of Injected Fluid:

Since the only fluid to be injected is the leachate (salt water) from the landfill and contaminated runoff water from the ALERIS facility, no major changes are expected in chemical and physical characteristics of the injection fluid. Sampling of injection fluid will be on a qualified laboratory for analysis. The sample will be analyzed for the following parameters:

pH	specific gravity
sulfate	barium
calcium	total iron
sodium	bicarbonate
carbonate	ammonia
chlorides	magnesium
aluminum	cadmium
lead	total suspended solids
total dissolved solids	carbon dioxide
dissolved oxygen	hydrogen sulfide

Results of laboratory analysis will be submitted to U.S. EPA Region IV with the quarterly report.

Injection Pressure:

The injection pressure is monitored continuously through a recorder placed at the wellhead. An example copy of the recorder chart will be submitted with the quarterly report.

Injection Temperature:

The temperature of the injection fluid will be monitored continuously and will be recorded on the chart.

Annulus Pressure

The annulus of the injection well is maintained at a minimum positive pressure of 10 psig at the wellhead. Then the annulus pressure of the injection well will be monitored continuously on a pressure recorder. An example copy of the recorder chart will be submitted with the quarterly report.

Flow Rate:

The flow rate into the injection well is continuously monitored with a totalizer that is set in the injection line. The totalizer is a digital flow meter that records the total flow in. The totalizer readings are done daily so that the daily flow rate can be calculated from the daily flow in. Table P-1 shows the daily record sheet that is used at the injection well. Also, a flow rate recorder is installed to continuously record the flow rate on the chart.

Record Keeping:

The pressures, temperature, and flow rate recorder charts and the daily record sheets are kept on file for five years and are open for inspection. After five years the may be disposed.

ATTACHMENT Q

PLUGGING AND ABANDONMENT PLAN

Through tubing, a plug will be set in the landing nipple below the 4 1/2" x 2 7/8" packer. The 2 7/8" and 3 1/2" tubing will be released from the packer and pulled out of the well. The 4 1/2" casing will be tested with 10 lbs/gallon brine plus 500 psig. Tubing will be run and the well will be cemented from 4703 feet to 2200 feet depth with approximately 500 sacks of sulfate resistant cement. The remaining part of the well (2200 to 40 feet depth) will be filled with mud and a cement plug will be installed at the top. The wellhead will be removed and a marker containing the date of plugging and permit number will be installed.

U.S. EPA, Region IV will be notified of the exact time during which plugging operations will take place.

The cost of plugging and abandonment is estimated at \$38,420.00. The financial documents are included in Attachment R,

*Need Cement to
plug 500 surface*

ATTACHMENT R

NECESSARY RESOURCES

Enclosed is an irrevocable standby letter of credit to assure availability of resources.



ENERGY AND ENVIRONMENT CABINET

Steven L. Beshear
Governor

Leonard K. Peters
Secretary

Department for Natural Resources
Division of Oil and Gas
Post Office Box 2244
Frankfort, KY 40601
Phone: (502) 573-0147 Fax: (502) 573-1099
www.dogc.ky.gov

July 01, 2010

ALBRIS INTERNATIONAL, INC
25825 SCIENCE PARK DRIVE, STE 400
BRACHWOOD, OH 44112

Re: \$6,500.00 Individual Letter of Credit # DBS-18278

Dear Sir:

You have satisfied the requirements outlined under Chapter 353 of the Kentucky Revised Statutes on the above referenced bond. We are therefore returning this bond to you for release.

Sincerely,

Kim S. Collings
Kimberly S. Collings
Division of Oil and Gas
Enclosure

1L8221045



COMMONWEALTH OF KENTUCKY
DEPARTMENT OF MINES AND MINERALS
DIVISION OF OIL AND GAS
P.O. BOX 2244
FRANKFORT, KY 40601

ISSUER
Deutsche Bank AG New York Branch
60 Wall Street ADDRESS
New York, NY 10005
Operations - Housing & Telecom E-MAIL ADDRESS
212 250-1014 PHONE
EVERETTUS Housing CONTACT

IN REFERENCE TO:

LETTER OF CREDIT NUMBER 0155-18278
DATED 6/18/2009
AMOUNT \$6,500.00
ISSUED BY Deutsche Bank New York Branch #1888210
ACCOUNTANT PARTY-OPERATOR EVERIS International, Inc #15221

WE ENCLOSE THE ORIGINAL OF THE ABOVE-REFERENCED LETTER OF CREDIT OPENED IN YOUR FAVOR.

WE CONFIRM THE CREDIT AND HEREBY UNDERTAKE THAT ALL DRAFT(S) OR OTHER DEMANDS DRAWN IN COMPLIANCE WITH TERMS OF THE ORIGINAL CREDIT AND ANY OTHER CONDITIONS STATED THEREIN, SHALL BE HONORED.

BY: [Signature]
TITLE: Vice President

Handwritten:
Approved by
June 19-09
T-1-000





Deutsche Bank AG New York
GLOBAL LOAN OPERATIONS, STANDBY LETTER OF CREDIT UNIT
80 WALL STREET, MS NYC60-0928
NEW YORK, NY 10005

IRREVOCABLE STANDBY LETTER OF CREDIT DBS-18278

DATE: JUNE 18, 2009

BENEFICIARY:
COMMONWEALTH OF KENTUCKY
DEPARTMENT OF MINES AND MINERALS
DIVISION OF OIL AND GAS
P. O. BOX 2244
FRANKFORT, KY 40601

APPLICANT:
ALBRUS INTERNATIONAL, INC.
25825 SCIENCE PARK DRIVE
SUITE 400
BEACHWOOD, OHIO 44122

DEAR DEPARTMENT:

WE HEREBY OPEN OUR IRREVOCABLE LETTER OF CREDIT NO. DBS-18278 IN YOUR FAVOR FOR THE ACCOUNT OF ALBRUS INTERNATIONAL, INC.; AS OPERATOR, TO COVER WELLS DRILLED, DEEPENED, REOPENED, OR TRANSFERRED TO THE ABOVE-NAMED PRINCIPAL, FOR THE SUM OF US\$6,500.00 (SIX THOUSAND FIVE HUNDRED AND NO/100 UNITED STATES DOLLARS), AVAILABLE BY YOUR DRAFT OR OTHER DEMAND ON US AT SIGHT.

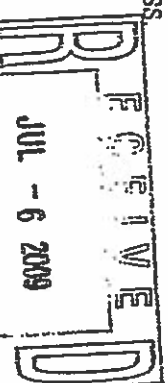
THIS LETTER OF CREDIT CONSTITUTES COLLATERAL SECURITY FOR PERFORMANCE OF THE ABOVE-NAMED OPERATOR'S OBLIGATIONS UNDER KRS 353.590.

THIS LETTER OF CREDIT SHALL BE SUBJECT TO TERMS CONTAINED HEREIN AND SHALL COVER ALL WELLS AS SECURITY UNTIL PLUGGED WITH THE DEPARTMENT'S APPROVAL AND ALL RECORDS REQUIRED BY THE DEPARTMENT ARE PROPERLY FILED OR ALL WELLS COVERED BY THIS LETTER AS SECURITY ARE TRANSFERRED TO A SUCCESSOR OPERATOR WITH BOND AS PROVIDED IN KRS 353.590 OR THE OPERATOR POSTS A SUBSTITUTE BOND TO REPLACE THIS LETTER OF CREDIT SUBJECT TO THE DEPARTMENT'S APPROVAL.

ALL DRAFTS DRAWN UNDER THIS LETTER OF CREDIT ARE TO BE ENDORSED THEREON AND SHALL BEAR THE CLAUSE "DRAWN UNDER LETTER OF CREDIT NO. DBS-18278." THIS LETTER OF CREDIT IS EFFECTIVE AS OF JUNE 18, 2009 AND SHALL EXPIRE ON FEBRUARY 8, 2010, BUT SUCH EXPIRATION DATE SHALL BE AUTOMATICALLY EXTENDED FOR A PERIOD OF ONE YEAR AND EACH SUCCESSIVE EXPIRATION DATE, UNLESS AT LEAST 120 DAYS BEFORE THE CURRENT EXPIRATION DATE, WE NOTIFY BOTH YOU AND THE OPERATOR BY CERTIFIED MAIL THAT WE HAVE DECIDED NOT TO EXTEND THIS LETTER OF CREDIT BEYOND THE CURRENT EXPIRATION DATE. IN THE EVENT YOU ARE SO NOTIFIED, ANY UNUSED PORTION OF THE CREDIT SHALL BE AVAILABLE UPON PRESENTATION OF YOUR SIGHT DRAFT FOR 120 DAYS AFTER THE DATE OF RECEIPT BY YOU AS SHOWN ON THE SIGNED RETURN RECEIPT.

WE HEREBY AGREE WITH YOU THAT ALL DRAFTS DRAWN UNDER AND IN COMPLIANCE WITH THE TERMS OF THIS LETTER OF CREDIT SHALL BE DULY HONORED UPON PRESENTATION TO US, AND WE SHALL REMIT THE AMOUNT OF THE DRAFT BY CERTIFIED CHECK PAYABLE TO THE "KENTUCKY STATE TREASURER" IN ACCORDANCE WITH YOUR INSTRUCTIONS.

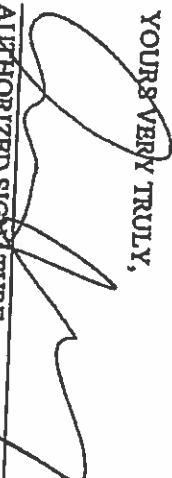
WE SHALL GIVE NOTICE WITHIN FIFTEEN (15) DAYS TO THE OPERATOR, AND THE DIRECTOR, DIVISION OF OIL AND GAS, OF ANY NOTICE RECEIVED OR ACTION FILED ALLEGING OUR INSOLVENCY OR BANKRUPTCY, OR ALLEGING ANY VIOLATION OF REGULATORY REQUIREMENTS WHICH COULD RESULT IN SUSPENSION OF REVOCATION OF OUR CHARTER OR LICENSE TO DO BUSINESS.

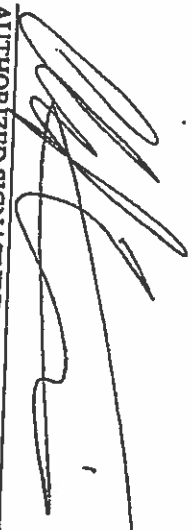


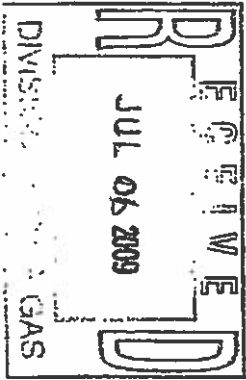
Deutsche Bank 

EXCEPT AS OTHERWISE EXPRESSLY STATED HEREIN, THIS CREDIT IS SUBJECT TO THE UNIFORM
CUSTOMS AND PRACTICE FOR DOCUMENTARY CREDITS (2007 REVISION) INTERNATIONAL CHAMBER OF
COMMERCE, PUBLICATION NO. 600.

YOURS VERY TRULY,


AUTHORIZED SIGNATURE


AUTHORIZED SIGNATURE





ENERGY AND ENVIRONMENT CABINET

Steven L. Beshear
Governor

Department for Natural Resources
Division of Oil and Gas
Post Office Box 2244
Frankfort, KY 40601
Phone: (502) 573-0147 Fax: (502) 573-1099
www.dogc.ky.gov

Leonard K. Peters
Secretary

July 7, 2010

Aleris International, Inc.
25825 Science Park Drive
Beachwood, OH 44122

RE: \$6,500.00 Individual Letter of Credit
#DBS-18278

Dear Sir:

Please be advised that the Division of Oil and Gas has replaced your Letter of Credit referenced above with the \$6,500.00 cash bond that was received (Cashier's Check #9030104136).

The Division of Oil and Gas has also completed your request to change the name of your company from Aleris International, Inc. to Aleris Recycling, Inc. All future correspondence with this office should reflect Aleris Recycling, Inc.

Your bond shall remain on file until the well is either plugged with all records on file or until it has been transferred to another operator. If you have any questions, please call our office.

Sincerely,

Deana Wilmoth
Division of Oil and Gas
Bonds and Transfers

Aleris Recycling Inc.
25825 Science Park Drive
Beachwood, Ohio 44122

OR#15221
V 8223586
replaces 148221042
Aleris

Division of Oil and Gas
Commonwealth of Kentucky
1025 Capital Center Drive
Frankfort, KY 40601

Attention: Deana Wilmoth

Enclosed is cashier's check no. 9030104136 in the amount of six thousand five hundred dollars (\$6,500.00) payable to the Kentucky State Treasurer. This check represents cash bond from Aleris Recycling, Inc. for a well operated by Aleris Recycling, Inc.

Upon acceptance of this cash bond, Aleris Recycling, Inc. requests that you complete the name change of the well operator from Aleris International, Inc. to Aleris Recycling, Inc. Also upon acceptance, we request that you return the current security from Aleris International, Inc., a letter of credit, issued by Deutsche Bank AG New York, numbered DBS-18278 along with a letter of authorization to cancel this letter of credit. The letter of credit should be returned as follows:

Deutsche Bank AG New York
Global Loan Operations
Standby Letter of Credit Unit
60 Wall Street, MN NYC60-0926
New York, NY 10005

We also ask that you return a copy of this letter to us at the address above to my attention, acknowledging receipt and acceptance of this cash bond.

Thank you for your assistance with this matter, should you have any questions, please contact Gary Kolk at 216-910-3451.

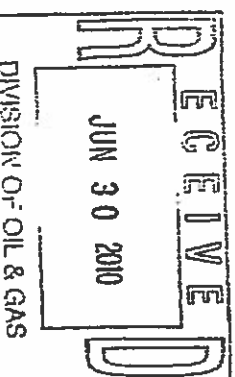
Very truly yours,


Michael J. Hobe
Vice President and Treasurer

Encl. : cashier's check

The Division of Oil and Gas acknowledged receipt of and accepts from Aleris Recycling, Inc. \$6,500.00 cash bond for a well operated by Aleris Recycling, Inc.


Division of Oil and Gas



CHASE

CASHIER'S CHECK

Remitter ALERIS RECYCLING, INC.

9030104136 253 #11073
Date 06/29/2010

Pay: SIX THOUSAND FIVE HUNDRED DOLLARS AND 00 CENTS

Pay To The Order Of KENTUCKY STATE TREASURER

\$ *****6,500.00 ***

DRAWN: JPMORGAN CHASE BANK, N.A.
Michael J. [Signature]
Senior Vice President
JPMorgan Chase Bank, N.A.
Columbus, OH

⑈9030104136⑈ ⑆044000037⑆ 758551318⑈



ENERGY AND ENVIRONMENT CABINET

Steven L. Beshear
Governor

Department for Natural Resources
Division of Oil and Gas
Post Office Box 2244
Frankfort, KY 40601
Phone: (502) 573-0147 Fax: (502) 573-1099
www.dogc.ky.gov

Leonard K. Peters
Secretary

July 7, 2010

Deutsche Bank AG New York
Global Loan Operations
Standby Letter of Credit Unit
60 Wall Street, MN NYC60-0926
New York, NY 10005

RE: \$6,500.00 Individual Letter of Credit
#DBS-18278

Dear Sir:

Enclosed you will find the release for the above-referenced Letter of Credit. If you have any questions, please call our office.

Sincerely,

Deana Wilmoth
Division of Oil and Gas

cc: Alerts International, Inc.
25825 Science Park Drive
Beachwood, OH 44122



BANK OF AMERICA - CONFIDENTIAL

PAGE: 2

THIS IS AN INTEGRAL PART OF LETTER OF CREDIT NUMBER 68052103

DRAFT FOR 120 DAYS AFTER THE DATE OF RECEIPT BY BOTH YOU AND ALERIS INTERNATIONAL, INC., AS SHOWN ON THE SIGNED RETURN RECEIPTS.

WHENEVER THIS LETTER OF CREDIT IS DRAWN ON UNDER AND IN COMPLIANCE WITH THE TERMS OF THIS CREDIT, WE SHALL DULY HONOR SUCH DRAFT UPON PRESENTATION TO US, WE SHALL DEPOSIT THE AMOUNT OF THE DRAFT DIRECTLY INTO THE STANDBY TRUST FUND NUMBER 161600037 OF ALERIS INTERNATIONAL, INC. IN ACCORDANCE WITH YOUR INSTRUCTIONS

DRAFTS DRAWN UNDER THIS LETTER OF CREDIT MUST BE MARKED: "DRAWN UNDER BANK OF AMERICA, N.A. LETTER OF CREDIT NO. 68052103 "

THIS LETTER OF CREDIT IS SUBJECT TO THE UNIFORM CUSTOMS AND PRACTICE FOR DOCUMENTARY CREDITS (2007 REVISION), INTERNATIONAL CHAMBER OF COMMERCE, PUBLICATION NUMBER 600.

THE OPERATIONS OF THIS BANK ARE REGULATED AND EXAMINED BY A STATE OR FEDERAL AGENCY.

WE HEREBY ENGAGE WITH YOU THAT DRAFT(S) DRAWN UNDER AND PRESENTED IN COMPLIANCE WITH THE TERMS AND CONDITIONS OF THIS LETTER OF CREDIT WILL BE DULY HONORED IF PRESENTED TO US AT THIS OFFICE ON OR BEFORE THE EXPIRY DATE OR ANY AUTOMATICALLY EXTENDED EXPIRY DATE.

VERY TRULY YOURS,

BANK OF AMERICA, N.A.
1 FLEET WAY
SCRANTON, PA 18507
ATTN: STANDBY LETTER OF CREDIT DEPT.


AUTHORIZED SIGNATURE

NAME Michael Grezant

DATE 9-28-18

ORIGINAL

Bank of America



BANK OF AMERICA - CONFIDENTIAL

PAGE: 1

DATE: SEPTEMBER 28, 2010

IRREVOCABLE STANDBY LETTER OF CREDIT NUMBER: 68052103

ISSUING BANK
BANK OF AMERICA, N.A.
ONE FLEET WAY
PAG-580-02-30
SCRANTON, PA 18507-1999

BENEFICIARY
U.S. ENVIRONMENTAL PROTECTION
AGENCY REGION 4, 61 FORESTH ST
9AM NUNN ATLANTA FEDERAL CENTER
ATLANTA, GEORGIA 30303-8960

APPLICANT
ALERIS INTERNATIONAL, INC. O/B/O
ALERIS RECYCLING, INC., 25825
SCIENCE PARK DRIVE, SUITE 400
BEACHWOOD, OH 44122

AMOUNT
NOT EXCEEDING USD 38,420.00
NOT EXCEEDING THIRTY EIGHT THOUSAND FOUR HUNDRED TWENTY AND 00/100'S US
DOLLARS

EXPIRATION
SEPTEMBER 28, 2011 AT OUR COUNTERS

DEAR SIR OR MADAM:

WE HEREBY ESTABLISH OUR IRREVOCABLE STANDBY LETTER OF CREDIT NO.
68052103 IN YOUR FAVOR, AT THE REQUEST AND FOR THE ACCOUNT OF ALERIS
INTERNATIONAL, INC. ON BEHALF OF ALERIS RECYCLING, INC., 25825
SCIENCE PARK DRIVE, SUITE 400, BEACHWOOD, OH 44122 DE TO THE
AGGREGATE AMOUNT OF THIRTY EIGHT THOUSAND FOUR HUNDRED TWENTY AND
00/100 UNITED STATES DOLLARS (USD 38,420.00), AVAILABLE UPON
PRESENTATION BY YOU OF,

(1) YOUR SIGHT DRAFT, BEARING REFERENCE TO THIS IRREVOCABLE STANDBY
LETTER OF CREDIT NO. 68052103, AND

(2) YOUR SIGNED STATEMENT READING AS FOLLOWS: "I HEREBY CERTIFY THAT
THE AMOUNT OF THE DRAFT IS PAYABLE PURSUANT TO REGULATIONS ISSUED
UNDER AUTHORITY OF THE SAFE DRINKING WATER ACT."

THIS LETTER OF CREDIT IS EFFECTIVE AS OF SEPTEMBER 28, 2010 AND SHALL
EXPIRE ON SEPTEMBER 28, 2011 BUT SUCH EXPIRATION DATE SHALL BE
AUTOMATICALLY EXTENDED FOR A PERIOD OF ONE YEAR AND EACH SUCCESSIVE
EXPIRATION DATE, UNLESS AT LEAST 120 DAYS BEFORE THE CURRENT
EXPIRATION DATE, WE NOTIFY BOTH YOU AND ALERIS INTERNATIONAL INC. ON
BEHALF OF ALERIS RECYCLING, INC., BY CERTIFIED MAIL THAT WE HAVE
DECIDED NOT TO EXTEND THIS LETTER OF CREDIT BEYOND THE CURRENT
EXPIRATION DATE. IN THE EVENT YOU ARE SO NOTIFIED, ANY UNUSED PORTION
OF THE CREDIT SHALL BE AVAILABLE UPON PRESENTATION OF YOUR SIGHT

ORIGINAL

TRUST AMENDMENT

WHEREAS the Grantor and Trustee are parties to a Staudby Trust Agreement (hereinafter the "Agreement,") dated September 22, 2008, wherein, pursuant to Section 16, said Agreement "... may be amended ..."

NOW, THEREFORE, on this 28th day of September, 2010, in consideration of the foregoing and of the mutual covenants set forth herein, the parties hereto agree to Amend the original Agreement as follows:

1. The Grantor shall be hereinafter known as **Aleris Recycling, Inc.**
2. Schedule A of the Agreement (Identification of Facilities and Cost Estimates) remains in full force and effect;
3. Schedule B of the Agreement (Identification of Fund) is hereby deleted in its entirety and replaced with "new" Schedule B, attached hereto;
4. All other provisions of the original Agreement shall be unmodified, and remain in full force and effect, in accordance with Section 17 of the Agreement.

For Aleris Recycling, Inc., Grantor


Printed Name: Michael J. Hobey
Title: Vice President and Treasurer

For Huntington Bank, Trustee

Printed Name: Gregory W. Klueber
Title: Vice President & Trust Officer

For The Director

Printed Name: _____
Title: _____

TRUST AMENDMENT

WHEREAS the Grantor and Trustee are parties to a Standby Trust Agreement (hereinafter the "Agreement") dated September 22, 2008, wherein, pursuant to Section 16, said Agreement "... may be amended ..."


NOW, THEREFORE, on this 28th day of September, 2010, in consideration of the foregoing and of the mutual covenants set forth herein, the parties hereto agree to Amend the original Agreement as follows:

1. The Grantor shall be hereinafter known as Aleris Recycling, Inc.
2. Schedule A of the Agreement (Identification of Facilities and Cost Estimates) remains in full force and effect;
3. Schedule B of the Agreement (Identification of Fund) is hereby deleted in its entirety and replaced with "new" Schedule B, attached hereto;
4. All other provisions of the original Agreement shall be unmodified, and remain in full force and effect, in accordance with Section 17 of the Agreement.

For Aleris Recycling, Inc., Grantor

Printed Name:
Title:

For Huntington Bank, Trustee



Printed Name: Gregory W. Klueh
Title: Vice President & Trust Officer

For The Director

Printed Name:
Title:

AMENDED
SCHEDULE A
Identification of Facilities and Cost Estimates
Amended September 28, 2010

Schedule A is referenced in the Trust Agreement dated September 22, 2008
by and between Aleris Recycling, Inc. ("new" name of owner or operator)
the "Grantor," and Huntington National Bank (name of trustee) the "Trustee."

EPA identification number: KYSD310117

Name of facility: IMCO #1 Permit Number KY 10429

Address of facility: 609 Gardner Camp Road
Highway 1468
Morgantown, Butler County,
Kentucky

Current plugging and
Abandonment cost estimate: \$ 38,420.00 /

Date of estimate: May 29, 2009

AMENDED
SCHEDULE B
Identification of Fund
Amended on September 28, 2010

Schedule B is referenced in the Trust Agreement dated September 22, 2008
by and between Alois Recycling, Inc. ("new" name of owner or operator)
the "Grantor," and Huntington National Bank (name of trustee) the "Trustee;"

The fund consists of: (check one and provide identification number)

☒ Irrevocable Letter of Credit No. DBS—68052103
Issued by Bank of America, NA, effective on September
28, 2010

☐ Surety Performance Bond No. _____

☐ Other (describe) _____

ATTACHMENT S

NOT APPLICABLE

ATTACHMENT T

EXISTING PERMITS

Aleris Recycling Inc. has the following permits from the Kentucky Department for Environmental Protection:

- 1) Solid Waste Disposal Facility, Permit No: 016.00004. This facility is about 600 feet southwest if the injection well.
- 2) Permit from the Division of Air Quality, Title V Operating Permit No: V-06-047.
- 3) Aleris Recycling Inc. has KPDES Permit No. KY0107182.
- 4) Hazardous Material Transport (DOT), Permit No. 060210552052S.

ATTACHMENT U

NATURE OF BUSINESS

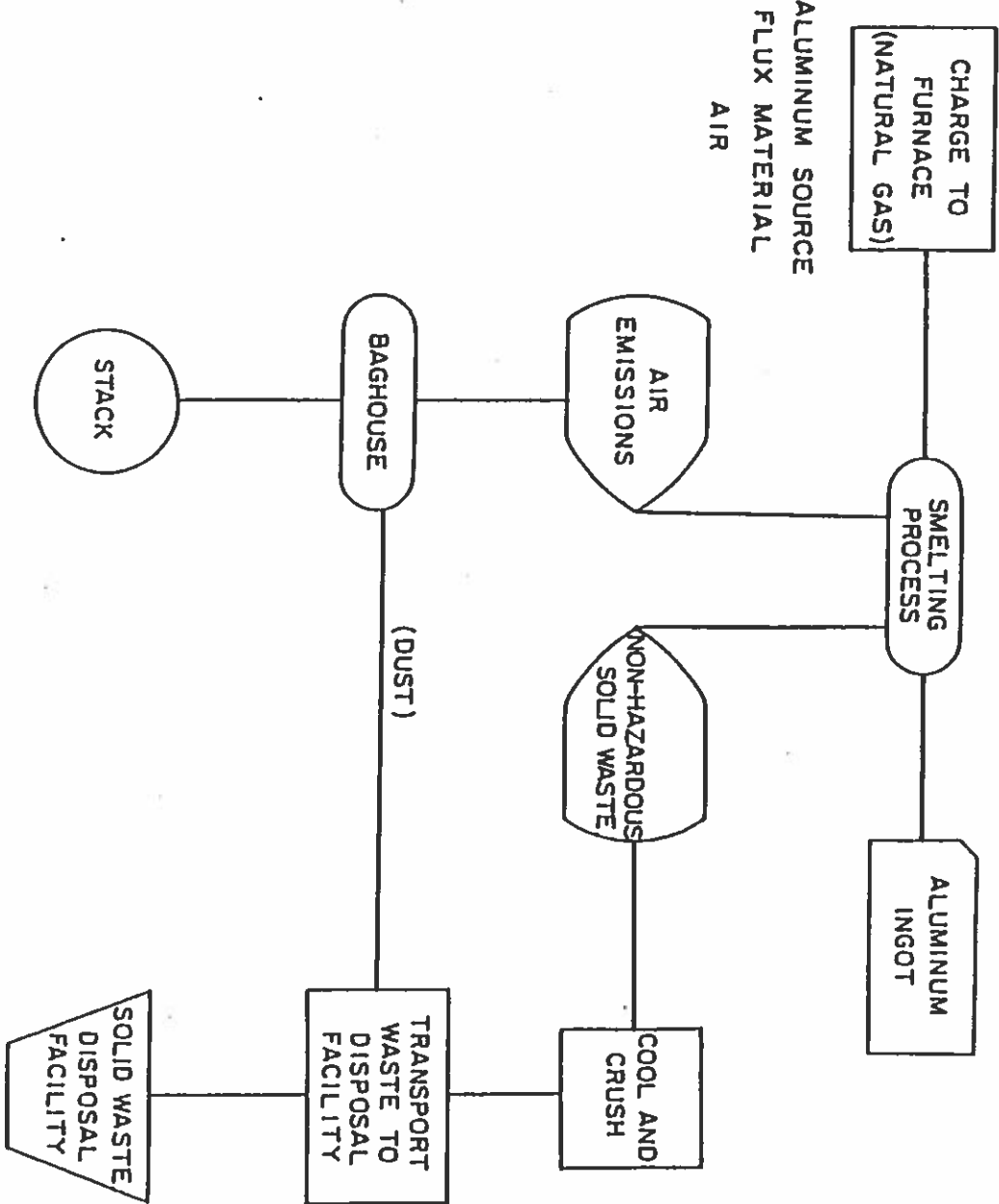
Aleris Recycling Inc. Morgantown Plant is a secondary aluminum smelter plant. The plan consists of six rotary furnaces, six burners, and associated air pollution control equipment.

Figure U-1 shows schematically the process diagram of the facility.

During the smelting process, the various types of scrap are charged to the furnace and melted. The “melt” is then covered with a salt flux (NaCl, KCl, or MgCl₂) to reduce oxidation during scrap melting. As metal ingots or anodes are cast from the melt, the fluxing salts and non-metal contaminants from the scrap and dross remain in the furnace as solid waste. The slag (solid waste) is removed from the furnace and allowed to cool. After cooling, the slag is crushed and transported to the on-site non-hazardous solid waste disposal landfill.

The salt water leachate (brine) from the landfill and the contaminated runoff water from the plant site are injected into the on-site injection well.

FLOW CHART OF PLANT OPERATIONS
IMCO RECYCLING, INC. MORGANTOWN KENTUCKY



A
A. & M. ENGINEERING AND
ENVIRONMENTAL SERVICES, INC.
TULSA, OKLAHOMA

SCALE:	DATE	FIGURE U-1
APPROVED BY	DRAWN BY	DRAWING NO.

REFERENCES

- Gildersleeve, B., 1972, Geologic map of the Morgantown quadrangle, Butler and Warren Counties, Kentucky: U.S. Geol. Surv. Quad. MapGQ-1040.
- Hopkins, H.T., 1966, Fresh saline water interface map of Kentucky: Kentucky Geol. Surv., Series X, Scale 1:500,000.
- Maxwell, B. W., and Devaul, R. W., 1962, Reconnaissance of groundwater resources in the Western Coal Field Region, Kentucky: U.S. Geol. Surv. Water-Supply paper 1599, 34 p.
- Schwalb, H.R., 1975, Oil and gas in Butler County, Kentucky: Kentucky Geol. Survey, Series X, Report of Investigation 16, 65 p.
- Townsend, M.A., and Cordivola, S., 1982, Evaluation of selected geological units for potential use in underground storage of waste: Kentucky Geol. Survey.
- Warner, D.L., and Lehr, J.H., 1981, Subsurface wastewater injection – the technology of injecting wastewater into deep wells for disposal: Berkeley, CA., Premier Press, 344 p.